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**DISEASES**  
**OF THE**  
**THROAT AND NASAL CAVITIES.**

**BROWNE ON THE THROAT.—Now Ready.**

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**THE**

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**HENRY C. LEA, Philadelphia.**

HANDBOOK  
OF  
DIAGNOSIS AND TREATMENT  
OF  
DISEASES  
OF THE  
THROAT AND NASAL CAVITIES.

BY  
CARL SEILER, M.D.,  
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CHIEF OF THE THROAT DISPENSARY AT THE UNIVERSITY  
HOSPITAL; CURATOR OF THE PATHOLOGICAL  
SOCIETY, ETC. ETC.

WITH THIRTY-FIVE ILLUSTRATIONS.



PHILADELPHIA:  
HENRY C. LEA.

1879.

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COLLINS, PRINTER.

## P R E F A C E.

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THIS little volume is intended to serve as a guide to students of laryngoscopy in acquiring the skill requisite to the successful diagnosis and treatment of diseases of the larynx and naso-pharynx. All purely theoretical considerations have therefore been omitted, and only points of practical importance have been discussed as concisely as possible, so that the work may be used as a ready book of reference on the subjects of which it treats.

Several affections, which are classed among systemic diseases, and merely exhibit severe laryngeal symptoms, such as scarlet fever, diphtheria, etc., have been omitted, since they do not strictly belong to maladies of the throat. The tables of symptoms to be found at the end of the volume are based upon carefully kept records of over one thousand cases treated by the author in private practice, and at the Dispensary of the University Hospital, as well as in the German Throat Infirmary of Philadelphia.

I take this opportunity to express my thanks to Dr. J. Solis Cohen for his aid, and for kindly permitting me to use some of the illustrations which embellish his book on Throat Diseases.

CARL SEILER, M.D.

PINE STREET, PHILADELPHIA,  
May, 1879.

W. B. SEILER, PHILADELPHIA.

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# DISEASES

## OF THE

### THROAT AND NASO-PHARYNX.

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#### CHAPTER I.

##### THE LARYNGOSCOPE.

THE laryngoscope is a combination of two mirrors, so arranged as to enable the observer to see the interior of the larynx. The smaller of the two is plane, and is so introduced into the back part of the mouth as to be directly above the opening of the glottis, while the larger and generally concave mirror serves to throw a strong light into the mouth and upon the small mirror. The latter in turn reflects the light downward, and thus illuminates the interior of the larynx so that its image can be seen in the small mirror.

This apparatus, simple as it is, was not invented without much labor, and the experiments of Bozzini, Senn, Babington, Sellique, Liston, Avery, and others were requisite before García in 1854, and subsequently Czermak in 1857, were able to use the laryngoscope with advantage and give it its present form.<sup>1</sup>

<sup>1</sup> For details of the history of the Laryngoscope see "The Use of the Laryngoscope in Diseases of the Throat," by Morell Mackenzie.

*The Laryngeal Mirror.*—The laryngeal mirror as it is used now consists of a small piece of silvered glass set in a metal frame, and attached to a wire stem at an angle of not less than  $120^{\circ}$ . This

Fig. 1.



Laryngeal mirror.

stem, about four inches in length and about one-tenth of an inch in thickness, should be soldered to the back of the mirror in such a way that the rim of the frame forms the angle with the stem (Fig. 1), and should not be below it, as this would increase the diameter of the instrument without increasing its reflecting surface. The stem is made to slide into a hollow handle either of wood or of vulcanite rubber, and is clamped at any desired length by a set screw. This arrangement is preferable to a fixed handle, inasmuch as the stem can be pushed entirely into the handle, thus economizing space and rendering the instrument more portable. The handle should be a little more than three inches long and about one third of an inch in thickness.

Laryngeal mirrors of different shapes, square, oval, lozenge-shaped, etc., have been used by different observers, but it has been found that the circular form is the most easily borne by the patient, and can be used in the greatest number of cases. However, in cases where an hypertrophy of the tonsils exists, an oval mirror can be introduced between the protruding glands more easily than a round one.

Mirrors of polished steel, although they have a better reflecting surface than glass mirrors, are not to be recommended, because they are easily tarnished by the secretions of the mouth and pharynx, and are scratched in wiping them.

Dr. Mackenzie has also used total reflecting prisms mounted on handles like a laryngeal mirror, but has not found them to possess any advantage over glass mirrors.

The round glass mirrors vary in size from half an inch to an inch and a half in diameter, and are numbered by the instrument makers No. 1, 2, 3, 4, and so on. The size No. 3, a little more than three-quarters of an inch in diameter, is most serviceable, but in examining patients it is advisable to have at least three different sizes at hand.

*Illumination.*—In order to be able to see the laryngeal image in the small plane mirror, the larynx must be illuminated. This may be effected by throwing upon the laryngeal mirror when in position a strong light, which will be reflected downward into the laryngeal cavity. For this purpose either direct or reflected artificial light or sunlight may be used.

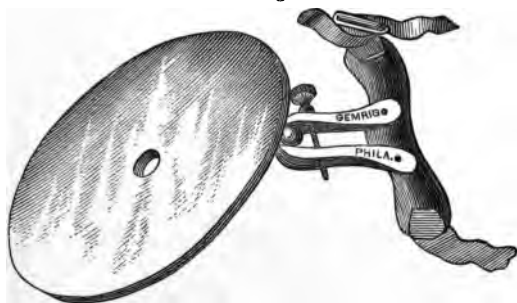
Reflected light may be obtained by throwing the light of a lamp, candle, gas-jet, or ordinary daylight into the mouth of the patient, by means of a circular, concave glass reflector.

*Reflector.*—This concave mirror should be from 3 to 4 inches in diameter, and should have a focus of from 10 to 14 inches; it should be silvered and not backed with amalgam. The metal frame in which it is set is attached, by means of a ball-and-socket joint, to some contrivance by which it can be supported on the ob-

server's head, or be attached to the source of illumination if artificial light be used.

Semeleder recommends for this purpose a spectacle-frame to which the reflector is fastened. By means of the ball-and-socket joint the concave mirror can be brought before either eye, or can be fixed in the middle of the forehead between the eyes. This arrangement, however, will be found not only insecure, but also very tiresome if the reflector has to be supported on the bridge of the nose for any length of time. A much better support for the reflector is the frontal band introduced by Cramer. This consists of a broad strap of some strong material, which passes around the head of the observer, and is fastened at the back by a buckle. To the part of the band resting on the forehead is attached a padded plate, to which the reflector is fastened with its ball-and-socket joint.

Fig. 2.



Head reflector.

(Fig. 2.) If a condensing apparatus is used for concentration of light, the reflector is attached to it by a jointed arm.

The reflector usually either has a hole in the middle,



or a small space in the centre is left unsilvered. This opening is intended to be brought before the pupil of one or the other eye of the observer in such manner that the line of vision and that of light have exactly the same direction. Using the reflector in this way like the reflector of the ophthalmoscope, it is easier to obtain an image of the larynx well illuminated, but with the great disadvantage of monocular vision, which makes all objects appear on the same plane, and prevents a correct interpretation of distances—a very important point in laryngoscopy. It will therefore be found more advantageous to place the reflector on the forehead, and from thence reflect light into the patient's larynx

Fig. 3.



Head reflector in position.

(Fig. 3). Both eyes may thus be employed in viewing the laryngeal image, and a correct idea of the relation of parts in regard to distances may be formed. The line drawn from the pupil of the eye to the laryngeal mirror, and a line from the reflector upon the forehead to the mirror, do not form an angle sufficient to make any very great difference in the reflection of the light downward, and very little difficulty will be experienced in obtaining the desired image. The head reflector should be concave when artificial light or ordinary daylight is used, but should be plane when direct sunlight is employed.

*Source of Light.*—As an artificial source of light a

candle, coal oil lamp, or gas flame suffices for ordinary purposes. But frequently it is desirable to have a much stronger light than can be obtained in this manner, and several forms of apparatus for concentrating artificial light have been constructed and are in use.

The simplest of these is the so-called "Schuster Kugel," first recommended by Türk, and used especially for clinical purposes by Stoerk and others. It

Fig. 4.



Tobold's illuminating apparatus.

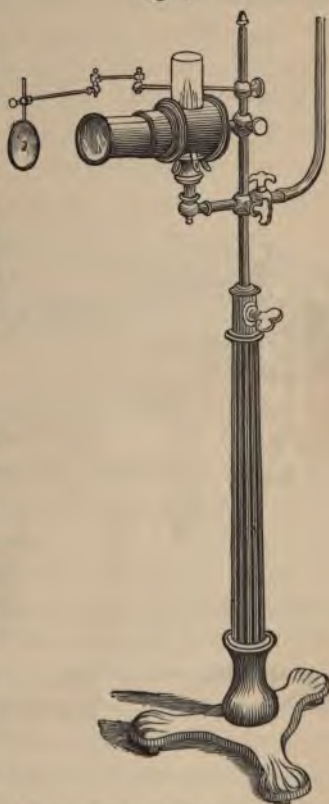
consists of a large spherical flask of glass filled with pure water, which is suspended in front of a lamp or gas jet, and which concentrates the light very powerfully. The concentrated beam of light is reflected from the head reflector into the mouth of the patient.

Tobold of Berlin constructed a more elegant light

concentrator for the laryngoscope, which is known as "Tobold's lamp." It consists of a brass tube containing several lenses, which are placed, one before the other, at such distances as to give the greatest possible amount of concentration of light. The back part of the tube is closed, while near the end two large holes are cut in its sides opposite to each other, through which the chimney of a lamp projects. The whole is fastened, by means of clamps, to a stand, to which is also attached a jointed arm bearing the reflector. (Fig. 4.) This apparatus is especially adapted for use in the office, where unless disturbed it can remain in the same place when not in use.

Dr. Solis Cohen has modified Tobold's apparatus by employing gas, and by inserting the rod which carries the concentrator and reflector in a metal stand so that the light can be raised and lowered more easily to suit the different heights of patients. (Fig. 5.)

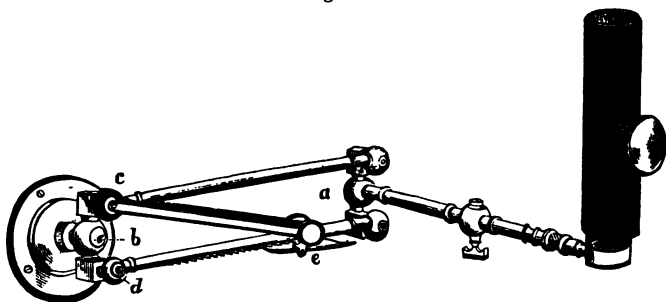
Fig. 5.



Cohen's modification of Tobold's lamp.

Dr. Mackenzie, of London, makes use of an adjustable gas fixture, which is secured to the wall like an ordinary bracket light, and which carries his light concentrator (Fig. 6). This apparatus, less compli-

Fig. 6.



Mackenzie's bracket-light concentrator.

cated, more portable, and yet quite as efficient as To-hold's, consists of a cylinder of sheet iron, about 6 inches long by  $2\frac{1}{2}$  in diameter. Near one end a hole is cut in the side of this cylinder, and a short piece of tube holding a condensing lens is attached to the edge of the hole. This lens, which is plano-convex, with a spherical curve, and of  $2\frac{1}{2}$  inches diameter, is placed with the plane side towards the light. The height of the cylinder is to be so adjusted as to bring the centre of the lens opposite the centre of the flame. (See Fig. 6.)

This concentrator is intended to be slipped over the chimney of an Argand burner, but it can also be used in connection with a candle, lamp, or ordinary gas flame, to which it can be fastened by spring clamps attached to the lower end of the cylinder. The concentrated light thus obtained is then reflected from the



head mirror, and can thus be thrown in any desired direction.

Direct illumination may be used for laryngoscopy by throwing the light of a concentrator, or even of an ordinary lamp, into the patient's mouth, and reflecting it downward by means of the laryngeal mirror. This method of illumination, although practised by some laryngoscopists in Europe, is not to be recommended, because the source of light must either be placed between the observer and the patient, which materially interferes with the use of the hands and arms; or the light must be thrown in an oblique direction, when the hand holding the mirror, or the lips and cheek of the patient, throw a shadow upon the mirror, either obscuring it entirely in many positions, or allowing but a part of its surface to be illuminated.

As has been remarked, the source of artificial light in laryngoscopy may be a candle, coal oil lamp, gas flame, or Argand burner, the latter giving perhaps the best light of all. Oxy-hydrogen and electric lights, both direct and reflected, are used by some laryngoscopists. The advantage claimed for this mode of illumination is that the light is pure white and strong. It is true that the yellow rays which are predominant in all other artificial lights make the mucous membrane appear redder than it really is, and the observer may be led to believe that a congestion exists if the patient be examined by white light first and then by yellow light on different occasions. But as all our knowledge and appreciation of shades of color depend upon comparison with a standard, it makes no difference whether this standard, as in the case before us,

be a little redder when viewed by yellow light or not so red when viewed by white light. This advantage of the white light is, therefore, not of much practical value, and the expense and difficulties connected with the use of oxy-hydrogen or electric light for laryngoscopy fully outweigh, except in rare instances, any advantage which can be claimed for it.

Czermak suggested another mode of illumination of the larynx, which he called "*illumination by transparency*." It consists in concentrating strong sunlight upon the outside of the neck, thus filtering the light, so to speak, through the tissues until it reaches the interior of the larynx; but even under favorable circumstances, as when the neck of the patient is thin and emaciated, only a very dimly lighted image of the larynx can be obtained by this means.

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## CHAPTER II.

### THE ART OF LARYNGOSCOPY.

BEFORE entering upon a description of the details of laryngoscopic examinations it will be necessary to understand the optical principle involved in the process. This principle is the law *that the angle of reflection is equal to the angle of incidence*. Applying this law to our case we find that, in order to illuminate the interior of the larynx, we must place a reflecting surface above the opening of the larynx at such an angle that the light received on this surface shall be reflected downward. The rays forming the

laryngeal image will then return in the usual way, that is, will be reflected from the same mirror to the eye of the observer. From this it will be seen that the nearer the head reflector is placed to the eye of the observer the better and the more easily will the image be seen.

It should always be borne in mind that the image seen in the mirror is a reflected one, like the image of one's self seen in a looking-glass. On account of the difference in height of the different parts forming the image, and because the mirror must be placed above and behind the opening of the larynx, it appears reversed in an antero-posterior direction. Parts that are in front appear in the image to be behind, and *vice versâ*. The same holds good when looking at a drawing of a laryngoscopic image.

*Position of Patient and Observer.*—The relative positions of the observer, the patient, and the source of light are of very great importance, especially for the beginner. The observer and patient should sit opposite each other, so that the eye of the former is about a foot from, and on a level with, the mouth of the latter, whose head should be slightly raised and inclined backward. The lamp or source of light should be placed to the left of and a little behind the patient, the centre of the

Fig. 7.



Chair with head-rest.

flame being on a level with the patient's eye. (See Fig. 4.) When the laryngoscope is frequently used at the office of the practitioner, it is of great advantage to have a head-rest, such as photographers use, attached to the chair occupied by the patient, so as to prevent any change of position of his head (Fig. 7).

The positions having been taken, the observer, by means of the reflector, then throws the light upon the patient's mouth, so that the circle of light is bounded above by the tip of the nose and below by the chin. If a reflector is used which is attached to a light concentrator, by means of a jointed arm, no difficulty will be experienced in throwing the light in the desired direction. If, on the other hand, the head reflector is employed, it is advisable to obtain an easy position for the head and then to move the reflector on its universal joint until the circle of light falls upon the patient's mouth, when the joint may be tightened, thus securing the reflector in the proper position. After this has been accomplished, the observer cannot turn his head without moving the light from the proper direction. The patient is then required to open the mouth as wide as possible, and, if the reflector has been correctly adjusted, the centre of the circle of light will fall upon the base of the uvula.

Before introducing the mirror, a careful inspection should be made of the parts displayed, and, if the tongue should obstruct the view by rising at its root, the patient should be required to pronounce the vowel sound of "Eh," which causes a rise of the velum palati and allows a view of the pharynx. In some cases it becomes necessary to depress the tongue



by means of an instrument called the tongue depressor, which will be described further on.

*Introduction of Laryngeal Mirror.*—The pillars, tonsils, uvula, and pharyngeal walls having been examined, the laryngeal mirror, after having been warmed to prevent the condensation of moisture on its reflecting surface, is introduced in the following manner:—

The handle is held between the thumb and forefinger of the right hand like a penholder, with the reflecting surface of the mirror looking downward. The hand is slightly flexed backward upon the wrist and is held a little below the mouth of the patient (Fig. 8). By a forward motion of the hand and a

Fig. 8.



Position of hand in holding the laryngeal mirror.

slight raising of the arm, the mirror is quickly carried into the mouth of the patient, until its back touches and raises the uvula. Meanwhile, the left hand of the observer has grasped the protruded tongue of the patient, and holds it by means of a soft

towel or napkin to prevent its slipping through the fingers. This holding of the tongue is necessary in order to increase the space in the pharynx, and also to raise the larynx and bring its opening nearer to the mirror. Care should be taken not to pull too hard, as the frænum of the tongue coming in contact with the edge of the lower teeth is easily injured. In cases where it is necessary to make applications to the throat, the operator needs both his hands, and the patient should therefore be taught to make traction upon his tongue himself.

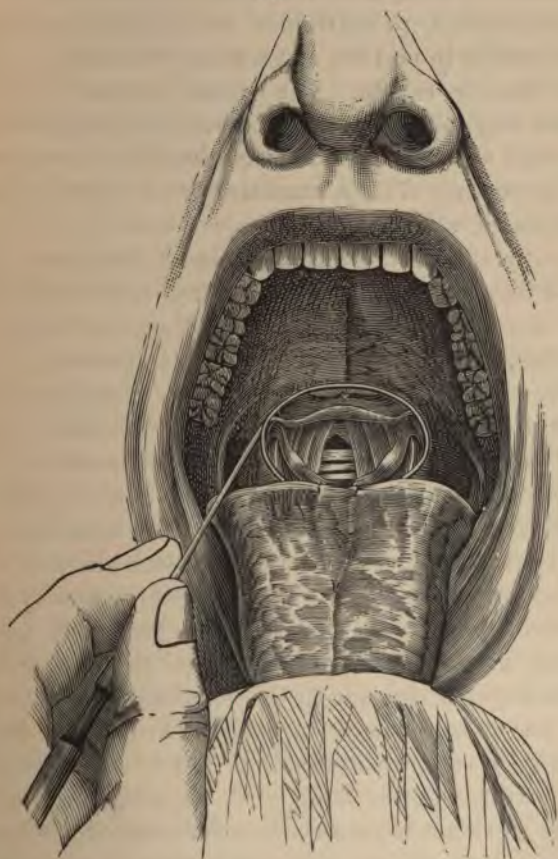
In the act of introducing the mirror great care should be taken not to touch the tongue or palate, as this not only injures the reflecting surface of the mirror for the time, but also produces gagging, especially in persons not accustomed to laryngoscopic examinations. Greater immunity from this inconvenience is obtained by carrying the instrument quickly and steadily back until the desired point is reached.

The handle of the mirror is then brought to one side until it lies in the angle of the mouth; this movement brings the hand out of the line of vision. In this position it is advisable to steady the hand by resting one or two fingers against the cheek of the patient. If the mirror, lifting the uvula and resting with its lower rim against the posterior wall of the pharynx, is allowed to tremble, gagging or retching immediately results, and prevents any further examination at that time.

When in position the mirror is slowly but steadily turned until the image of the larynx appears on its surface and can be examined (Fig. 9). The patient

is required to say "Eh," in order to cause a rising of the epiglottis and to enable us to see the vocal cords

Fig. 9.



Laryngeal mirror in position, displaying the laryngeal image. (Cohen.)

in motion. As soon, however, as there is any indication of gagging, the mirror should quickly be with-

drawn, for if this is not done retching will follow, and not only cause a slight hyperæmia of the mucous membrane, but also make the throat so sensitive that a further examination becomes impossible. It is always better to introduce the mirror frequently and leave it in position but a short time than to wait until gagging sets in. The throat, however, soon becomes very tolerant to the presence of the mirror when it is held still, and then the examination of the larynx can be prolonged for a considerable time, and is often terminated only by the mirror becoming cool and moisture condensing on its surface. In order to obviate this difficulty, Dr. Henry Wright recommended, and actually employed, a very ingenious plan for keeping the mirror at a uniform temperature. He attached to the back of the mirror an insulated spiral of thin platinum wire, which was connected with a small battery by means of thin copper wires running along the handle of the mirror. When the current is established, the electricity becomes concentrated in the spiral, and elevates its temperature and also that of the laryngeal mirror. It has recently been recommended to coat the mirror with glycerine, which would absorb the moisture; but this procedure materially interferes with the definition of the image, and has to be renewed every time the mirror is introduced. For all purposes it is best to slightly warm the mirror over the lamp, with the *glass* next to the flame so as not to injure the silver or amalgam backing by over-heating. Before introduction, the mirror should be placed against the cheek or the back of the hand of the observer, in order to test its temperature, and prevent its being placed in position while too hot.

*Obstacles to Laryngoscopy.*—The difficulties attending laryngoscopy, and the obstacles which prevent a good view of the larynx, must be considered under two heads: 1st. Those that are produced by the examiner himself, which have already been alluded to. They consist principally in an irritation of the fauces due to the trembling of the mirror when in position, and the touching of the back of the tongue or palate while introducing the mirror.

2d. Obstacles presented by the patient. They are dependent upon undue irritability or peculiar formation of certain parts of the throat.

Undue irritability of the fauces is of rare occurrence, and is usually confined to the posterior wall of the pharynx. In most cases due want of steadiness of the mirror is the exciting cause. It may be overcome by holding the mirror so that its lower rim does not touch the pharynx; by letting the patient drink a glass of ice-water immediately before the mirror is introduced, the cold producing local anæsthesia for a short time; or by employing some anæsthetic, such as ether or chloroform, thrown into the fauces by means of an atomizer. Painting the fauces with a strong solution of potassium bromide has been recommended, but I have not found it as reliable as I was led to believe. The surest means of overcoming this irritability is practice on the part of the patient, thus causing the parts to become accustomed to the presence of a foreign body. This consists in frequent introductions of the mirror, even without the anticipation of seeing anything on the part of the observer, or by directing the patient to introduce a teaspoon as far back into his throat as possible. If the patient is

willing to do this before a looking-glass three or four times a day, he will in a very short time be able to bear the mirror for a considerable time when held firmly without trembling. The greatest difficulty, however, experienced by the beginner, is caused by a rising of the back of the tongue at the approach of the mirror, in spite of the traction made at its tip. In such cases, which are rather frequent, the tongue should be depressed with the tongue depressor, not *forcibly*, but by slight long-continued pressure, which tires the muscles of the tongue and causes the organ to subside to a level with the lower teeth. If force be used, the tongue will slip from under the blade of the instrument and rise higher than before. This may recur repeatedly, until both the patient and the hand of the observer are tired out by futile efforts.

The tongue depressor, in the simplest form in which it is daily used by the general practitioner for examining the fauces, is the handle of a spoon. For laryngoscopic purposes the spoon is, however, not to be recommended, because the hand holding it must be on a level with the mouth, thus obstructing the view and light. An instrument has therefore been constructed which obviates this difficulty. It consists of a leaf-shaped blade of silver or german silver, bent at right angles and inserted into a flat wooden handle. The lower surface of the blade is slightly concave, and ribbed so as to take a better hold of the slippery back of the tongue, and from the bend is about three inches in length. It is introduced into the mouth as far back as possible, and pressed upon the back of the tongue, while the hand of the examiner is below the chin of the patient. For the sake of convenience



in carrying the instrument, the blade has been so hinged to the handle that it will fold up against the latter, and will open at a right angle with it (Fig. 10). Soon, however, the metal tongue depressor becomes tarnished by the secretions of the mouth or

Fig. 10.



Tongue depressor.

Fig. 11.



Cohen's tongue depressor.

by the substances used for applications to the throat, and then presents an appearance disgusting to many patients, who will not, on that account, submit to its use. For the sake of greater cleanliness, Dr. Solis Cohen devised a tongue depressor made of hard rubber; this is known as Cohen's tongue depressor (Fig. 11). It consists of a piece of ebonite bent upon itself, either end being a little over three inches long. The bend being more than at right angles, the hand holding the instrument rests underneath the chin of the patient; but, if a different curve be desired for any particular case, it can easily be obtained by placing the instrument for a little while in

hot water. When soft it can be bent into any shape, which it will retain when cooled by immersion in cold water.

Enlarged tonsils sometimes prevent the introduction of a round mirror into the fauces, while an oval one may be slipped between the projecting glands.

The most serious obstacle is a too large or a pendent epiglottis, which completely shuts out the view of the interior of the larynx. By letting the patient sing in a very high key, or making him laugh, we can frequently get a glimpse of his glottis. There are cases, however, fortunately not very common, where this is of no avail. Several observers have devised instruments for the purpose of holding the epiglottis forward while the mirror is in position. They are long, slender, slightly bent forceps, the shanks of which are crossed so that the ends are closed, instead of opened, by the spring. The ends are furnished with sharp points, which, when the forceps is applied, penetrate the mucous membrane and thus prevent slipping (Fig. 12). This is unnecessary, since forceps whose spring is sufficiently strong, and whose ends are well roughened, will hold the epiglottis without slipping. Several German laryngoscopists, in operations at the anterior angle of the glottis, have drawn a silk thread through the body of the epiglottis and held it up by pulling upon the ends hanging out of the mouth. They assert that no evil consequences have followed this procedure, and that the amount of pain caused by transfixing the epiglottis is scarcely worth mentioning. A better plan, however, is to attach to the epiglottis a so-called bull-nose forceps, such as used for the compression of arteries in surgi-

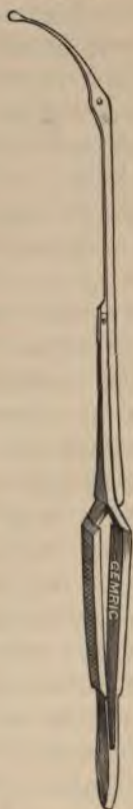


cal operations, with a string and small weight tied to it. The weight hanging out of the mouth of the patient makes traction upon the string and forceps, thus elevating the epiglottis. In most cases, at least the arytenoid cartilages can be seen without artificially elevating the epiglottis, and from them a great deal of information as to the movements of the cords and the condition of the mucous membrane can be obtained.

*Auto-laryngoscopy.*—The first successful attempts at laryngoscopy were made by Garcia on himself. He observed the action of his own larynx in singing. Since then auto-laryngoscopy has been frequently resorted to in order to obtain the necessary skill for manipulations necessary in laryngoscopy, for the hand is guided not only by the eye of the observer but also by the sense of touch in his throat, thus enabling him to detect and correct a false motion much more quickly.

The instruments needed for this method of examining the larynx are the same as are used for the examination of the larynx in others, with the addition of a plane mirror, in which the image of the

Fig. 12.



Elsberg's sponge holder and epiglottis forceps.

larynx reflected from the laryngeal mirror is seen. A short description of the procedure and of the position of the instruments will enable any one to practise auto-laryngoscopy.

The observer, having seated himself in a chair, with or without a head-rest, places in front of himself a lamp, at such a height that the centre of the flame is on a level with his mouth when the head is slightly raised and inclined backward. Immediately below the flame a small plane mirror, about four inches square, is fastened to the lamp, or, better still, is mounted on a separate stand and placed to the right of and a little above the flame. If a concave reflector is to be used to throw the light into the throat, the lamp is placed a little behind and on the right side of the observer's head, so that the light does not shine directly into his eyes and thus interfere with distinct vision. The reflector, mounted on a stand high enough to be on a level with the mouth and movable in all directions, is placed in front of the observer, and alongside of it the plane mirror. If sunlight can be obtained, the reflector can be dispensed with, and the plane mirror used to throw the light into the fauces, the observer seating himself with his back to a southern window and allowing the sun to shine on the plane mirror.

When all is ready, the laryngeal mirror having been warmed, the observer opens his mouth, pulls out his tongue with his left hand protected by a towel or napkin, and introduces the mirror quickly into the fauces, observing and guiding his motions by the image reflected from the plane mirror. Upon emitting a sound, and at the same time rotating the mirror

in the fauces until the laryngeal image appears on its reflecting surface, he can study the motions of his own larynx during vocalization, or quiet breathing, by the reflection of its image in the plane mirror before him.

The same precautions to prevent gagging have to be observed in auto-laryngoscopy as are necessary in examining a patient, and for this reason the beginner should commence by examining his own larynx, for then he will learn by his own and often painful experience how to overcome the obstacles to laryngoscopy much sooner than he would by practising first on others.

*Infra glottic Laryngoscopy.*—In some cases where tracheotomy has been performed, and the canula is fenestrated, the larynx can be seen from below by introducing a very small mirror through the tube with its reflecting surface turned upwards. Of course the image obtained in this way is an entirely different one from the ordinary image of the larynx as seen from above, and hardly anything else than the vocal cords, which on their under side are reddish and not pearl-white as on their upper surface, is noticed.

Only in cases where the larynx cannot be seen from above, on account of cicatrization of the epiglottis tying this organ down, or in cases of tumors extending below the glottis, is this method, which was called by Mackenzie "infra-glottic laryngoscopy," of any diagnostic value.

## RHINOSCOPY.

Several of the diseases of the throat either extend up into the posterior nares or originate there, and it

is often of great importance to make an examination of this cavity. A description of the methods employed in making an examination of the posterior as well as anterior nares will, therefore, not be out of place here.

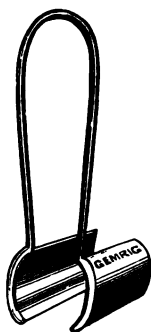
The examination of the anterior nares is very simple, and can in most cases be made without any special instruments. A strong light being thrown upon the patient's face, and the head inclined backward until the nose is on a level with the examiner's eye, the latter rests his fingers on the forehead of the patient and elevates the tip of the nose with his thumb. This opens the nostrils and allows the light to penetrate high up into the nares, so that the mucous membrane can be examined. When it is

Fig. 13.



Nostril dilator.

Fig. 14.



Thudichum's nasal speculum.

necessary to make applications to the mucous membrane or introduce an instrument for the removal of polypi or foreign bodies, a nostril dilator (Fig. 13) will be found advantageous. The best instrument

for this purpose is Thudichum's self-supporting nasal speculum (Fig. 14). It consists of a short wire bent like a horseshoe, carrying on its free ends two curved blades of metal of unequal length. The shorter one is placed against the septum of the nose, while the longer one presses against the inner side of the ala nasi. If the elastic force of the wire loop separating the blades and opening the nostril is too powerful, and thus causes pain, it should be pressed upon so as to weaken the spring. When introduced, this instrument retains itself in place, the wire loop being above the nose when in one nostril, and below when in the other.

The examination of the posterior nares is much more difficult than either laryngoscopy or the inspection of the anterior nares. It is accomplished by the same instruments and appliances used in laryngoscopy, namely a small plane mirror, and a strong light thrown into the fauces by means of a reflector.

It is generally advised to employ a small mirror, to illuminate and inspect the nasal cavity; I have found, however, that the larger the mirror that can be borne by the patient, the better can the cavity be illuminated. The mirror, having been warmed, is introduced into the fauces behind and below the soft palate, with its reflecting surface upward, the tongue being slightly depressed by means of the mirror itself. The patient is then required to breathe through his nose, or to say "*ang*," which causes the soft palate to drop forward and afford more space for the mirror. But it overhangs and covers, at the same time, part of the reflecting surface, and it is therefore desirable to have a large mirror.

The light received on the mirror is then directed upward and forward until the nasal cavity is well illuminated, when first one side and then the other of the nares can be examined by slightly rotating the mirror in the fauces.

The picture obtained in this way is entirely different from the laryngeal image, as will be seen from its description in the next chapter.

### CHAPTER III.

#### THE NORMAL LARYNGEAL AND RHINOSCOPIC IMAGES.

*Laryngeal Image.*—The scope of this book is not sufficiently extended to enter into a minute description of the anatomy of the larynx, which may be found in any text-book on general anatomy. Therefore only those parts which enter into the laryngeal image in the mirror will be described.

Supposing that the mirror, after having been introduced, displays a complete image of the laryngeal opening, such as is seen in Fig. 15, we observe a reddish-yellow arch, sometimes notched in the centre, with a roundish protuberance in front of it, of the same color, but not so well illuminated.

This arch is the upper margin of the *epiglottis*, and the backward bend of the organ near its insertion into the angle of the thyroid cartilage. In front of this protuberance, extending across the surface of the mirror, are seen two pairs of bands, the outer reddish, and the inner pearl-white when normal. These are



the ventricular bands and vocal cords. In quiet breathing a triangular space is noticed between the inner bands, with its apex posterior, and usually hidden by the arch of the epiglottis. In phonation this space

Fig. 15.



Laryngeal image.

is narrowed down to a slit, and is designated by the name *glottis*.<sup>1</sup>

In front, at the termination of the vocal cords, we notice two roundish prominences, with a depression between them, when the patient is breathing, but closely applied to each other in vocalization. These are the arytenoid cartilages as seen from above. On either side a curved band, with its concavity inward, extends backward to join the arch of the epiglottis. Along the course of these bands, which are the *ary-epiglottic folds*, we see two small nodules, the cartilages of Wrisberg and of Santorini.

In the female larynx we see, along the inner edges of the vocal cords, two yellowish stripes, very narrow and tapering toward their ends. These are the carti-

<sup>1</sup> The name *glottis* is frequently applied to the whole opening of the larynx, and in many books a very vague idea is given of its extent. By common consent, the term is applied to the space between the edges of the cords only.

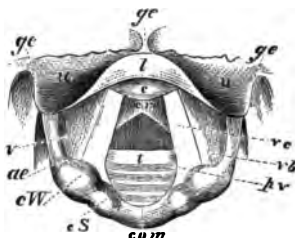
lages of Seiler, which are only rudimentary in the male larynx.

Behind and above the arch of the epiglottis, two dark oval spaces separated by a light band running backward are observed. These are the depressions on either side of the glosso-epiglottic fold, while the light band separating them is the fold itself.

By directing the reflected light a little forward we see back of these depressions a surface studded with round eminences, the back of the tongue with its papillæ.

Through the glottis when fully opened we can see into the inferior cavity of the larynx below the vocal cords, where a broad yellow band, the *cricoid* cartilage, appears, and below it the rings of the trachea elevating

Fig. 16.



Laryngoscopic drawing showing the vocal cords widely drawn apart, and the position of the various parts above and below the glottis during quiet breathing. *ge*. Glosso-epiglottic fold *S. u.* Upper surface of epiglottis. *l*. Lip or arch of epiglottis. *c*. Protuberance of epiglottis. *v*. Ventricle of the larynx. *ae*. Ary-epiglottic fold. *cW*. Cartilage of Wrisberg. *eS*. Cartilage of Santorini. *com*. Arytenoid commissure. *vc*. Vocal cord. *vb*. Ventricular band. *pv*. Processus vocalis. *cc*. Cricoid cartilage. *t*. Rings of trachea. (From Mackenzie.)

the mucous membrane. Not infrequently two dark circles separated by a bright line may be seen in the depths of the trachea, indicating the openings of the



bronchi, and the bifurcation of the trachea. (Figs. 16 and 17.) In very rare instances a beam of light can be thrown into the right bronchus, but very little can

Fig. 17.



Laryngoscopic drawing showing the approximation of the vocal cords and arytenoid cartilages, and the position of the various parts during vocalization. *fi*. Fossa innominata. *hf*. Hyoid fossa. *ch*. Cornu of hyoid bone. *cw*. Cartilage of Wrisberg. *cs*. Cartilage of Santorini. *a*. Arytenoid cartilages. *com*. Arytenoid commissure. *p v*. Processus vocalis and cartilages of Seiler. (From Mackenzie.)

be seen under such circumstances, as everything is very indistinct and differences of color cannot be determined.

*The Rhinoscopic Image.*—On account of the velum palati and the uvula covering the greater part of the reflecting surface of the mirror in rhinoscopy, a complete image can only be obtained in cases of cleft palate; but, by observing the different parts of the posterior nares in turn, a diagrammatic image can be constructed, which is, perhaps, for study, even better than one drawn from nature. Such a drawing is seen in Fig. 18.

We see in the middle of the drawing a triangular plate with its apex downward; this is the posterior margin of the vomer or nasal septum. On either side we notice curtain-like folds projecting toward the

septum; these are the posterior aspects of the turbinated bones. On either side of these and on the margin of the drawing we notice pointed elevations projecting toward the interior of the cavity with a crater-like depression on their apices; these are the

Fig. 18.



Rhinoscopic drawing (from Cohen). 1. Vomer or nasal septum. 2. Free space of nasal passage. 3. Superior meatus. 4. Middle meatus. 5. Superior turbinated bone. 6. Middle turbinated bone. 7. Inferior turbinated bone. 8. Pharyngeal orifice of Eustachian tube. 9. Upper portion of Rosemüller's groove. 11. Glandular tissue at the anterior portion of vault of pharynx. 12. Posterior surface of velum.

lateral pharyngeal walls, with the orifices of the Eustachian tubes. Above we see the vault of the pharynx, and below the posterior surface of the velum palati with the uvula.

The obstacles which have to be overcome in obtaining a view of the posterior nares are, first, the elevation of the back of the tongue, which, as we have seen, can be surmounted by gentle pressure with the tongue depressor, and, second, the elevation of the soft palate. This latter, however, does not, as a general rule, prevent an inspection of the nasal cavity; for the velum drops in the act of inspiration through

the nose, even if only for a short time. In the removal of foreign bodies or tumors from this cavity, it becomes necessary to secure the uvula by passing a loop of fine thread around it, and by fastening the end of the thread between the front teeth of the patient so as to prevent a rising of the palate. In this way all obstruction to the passage of the light and to vision is removed as far as possible.

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#### CHAPTER IV.

##### INSTRUMENTS ACCESSORY TO LARYNGOSCOPY AND THE TREATMENT OF LARYNGEAL DISEASES.

HAVING described the laryngoscope, the different modes of using it, and the appearances of the normal laryngeal and rhinoscopic images, it remains to describe some instruments which, in connection with the laryngoscope, are used for making further exploration of the parts by the sense of touch and for making applications to the diseased mucous membrane of the throat. The instruments used for the extraction of foreign bodies and the removal of neoplasms, as well as for the performance of other operations within the cavities of the throat and nose, will be treated of under their respective heads.

*The Laryngeal Sound.*—The eye is frequently unable to determine certain conditions seen in the laryngoscopic mirror, and others seen without it in the pharyngeal cavity. Hence the sense of touch aiding that of sight is frequently necessary in order

to form a correct opinion as to the condition of the parts. For this purpose in laryngoscopy as in surgery a sound is employed.

The laryngeal sound consists of a piece of silver wire rounded off at the end and held in a mirror handle. It should be flexible so that any desired curve can be given to it, but should be stiff enough to resist a considerable amount of pressure before yielding, and it should be long enough to reach to the anterior angle of the glottis without bringing the fingers holding the handle into the mouth of the patient, and thus obstructing the view. By means of the sound, attachments of tumors, depths of ulcers, etc., are determined.

*Sponge Holder.*—Most remedies employed as applications to the mucous membrane of the throat and nasal cavities are used in solution. They may be applied either with a sponge, a tuft of cotton, a brush, or as a finely subdivided spray.

A small piece of fine sponge tied securely to the end of a bent silver wire or sound, and dipped into the solution to be used, can be carried to any desired spot in the larynx, pharynx, or nasal cavities. This constitutes what is called a sponge holder. As it is necessary to renew the piece of sponge, or tuft of cotton which may be substituted for the sponge, with every application, it is more convenient to employ an instrument made for the purpose to which the piece of sponge or cotton can be quickly and securely fastened. The already-described epiglottis forceps may with advantage be employed for this purpose. A piece of wire bent to the proper curve, split at the end and secured in a wooden handle, is, however,



generally used as a sponge holder. A sliding ring slipped over the split end serves to approximate the two halves, thus securely holding a piece of sponge or tuft of cotton between them (Fig. 19). The sponge

Fig. 19.



Sponge holder.

or tuft of cotton should be small, only large enough to cover the ulcer or abrasion to which *alone* it is to be applied. The old-fashioned whalebone probang, with a large piece of rough sponge tied to the end, is altogether unfit for any application to the delicate mucous membrane of the throat.

*The Brush.*—In many cases a soft camel's hair brush securely fastened to a *stiff*, curved stem may be advantageously employed for touching ulcers or abrasions in the pharynx and larynx. The brushes should be mounted in a cap of hard rubber which can be screwed to the end of a silver laryngeal sound. Frequently, brushes are sold mounted in brass caps; these are not to be recommended, as the reagents used for applications attack the brass and loosen the hair so that single hairs and even large tufts of hair come out of the brush and are apt to remain in the throat of the patient, causing very unpleasant symptoms.

Another kind of brush is sold as a laryngeal brush. It is tied to a slender wire, having loops at the end for a handle. This kind is very unsatisfactory, inasmuch as the stem is too thin and elastic, and conse-

quently it is very difficult, or almost impossible, to touch any desired spot in the larynx or pharynx with the point of the brush.

*The Atomizer and Inhalations.*—Inhalations are in many cases of great benefit, and may be administered in the form of a finely subdivided spray or as vapors. The former is applicable for the inhalation of solutions of salts and non-volatile substances, but not for liquids containing resins.

Fig. 20.



Steam atomizer.

The spray is produced by means of an atomizer. Figs. 20 and 21 represent an instrument so well known to every one that it is unnecessary to enter into a minute description. Suffice it to say that a nebulization of the liquid is produced by forcing a current of air or steam through a small tube, the end of which is narrowed down to a very small opening. To this tube is attached at nearly a right angle another tube, one end of it also drawn out almost to a point, and situated slightly below the fine opening of the first

tube, while the other end dips into the solution to be vaporized. The air or steam rushing past the opening of the second tube tends to produce a vacuum in



it, and draws the liquid up until it overflows and is carried along with the air or steam in a finely subdivided state.

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Liquids containing gums or resins cannot be used in atomizers, because they clog the fine opening of the tube. As they are mostly volatile in a greater or less degree, they may be employed to advantage for inhalations in a different way.

*Vapor Inhalations.*—The simplest, but nevertheless a very effective, method of using resinous liquids containing volatile ingredients is to mix them with hot water in a tumbler or cup, over which the wide end of a funnel or paper cone is placed, while the vapor rising from the mixture is inhaled by deep inspirations from the narrow end of the funnel or cone.

A more convenient instrument for such inhalations is the so-called inhaling bottle, a wide-mouthed vial holding from four to six fluidounces. Its air-tight-fitting stopper of cork or rubber is perforated by two holes, each admitting a glass tube, one of which is straight, and long enough to reach from the top of the stopper to within a fraction of an inch of the bottom of the bottle; the other tube is slightly bent, and is pushed through the stopper until its lower end just protrudes below the under surface, the other end projecting several inches above the upper surface of the stopper. When it is to be used, the bottle is half filled with hot water, and a little of the resinous liquid is added to it. The stopper with the tubes is then replaced, and a deep inspiration is drawn through the bent tube. This causes a tendency to a vacuum in the bottle above the surface of the liquid, and a consequent rush of air through the straight tube, which on reaching the bottom of the vial bubbles up through the liquid and becomes impregnated with the volatile substances.



By inserting a small homoeopathic vial in the stopper, and bending the upper end of the long tube in the form of a hook, so that the opening of the tube fits over the opening of the small vial, the bottle can also be used for the inhalation of the fumes of muriate of ammonia. In order to obtain the latter, the large bottle is half filled with cold water, to which a few drops of strong aqua ammonia are added. The small vial is half filled with chemically pure hydrochloric acid. By exhausting the air in the bottle, the atmospheric pressure causes the fumes of the acid to pass down the tube and up through the ammoniated water. Combining with the ammonia the acid forms the muriate of ammonia in the state of dense white vapor.

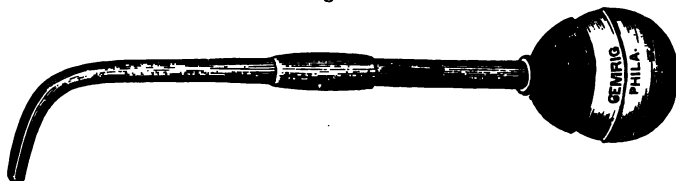
In certain cases of spasmodic affections of the larynx the inhalation of the vapors of nitrate of potash is used with very good results. Such vapors may be obtained by burning in a large jar, over which a funnel is placed, a piece of paper which has been soaked in a saturated solution of nitrate of potassa and then dried.

*Insufflator.*—Remedies are often applied to the throat in the form of an impalpable powder, and for this purpose an instrument called an insufflator is used (Fig. 22).

It consists of a tube of hard rubber or metal curved at one end and connected with a soft rubber ball at the other. Near the ball an elongated opening is cut into the side of the tube, which may be closed by sliding over it a short piece of another tube. When the instrument is to be used, the powder is placed in the opening, which is then closed by the sliding tube, and

the ball is compressed suddenly, thus causing a puff of air which carries the powder with it.

Fig. 22.



Insufflator.

An insufflator may be improvised by using a piece of glass tube or a piece of stiff writing paper rolled over a lead pencil, into which the powder is introduced and blown out by the breath of the physician.

*The Caustic Holder.*—Nitrate of silver, when it is to be applied to ulcers in the larynx or pharynx in the solid form, should be fused on to the roughened end of a silver probe by holding both the end of the stick of nitrate of silver and of the probe over a lamp, and causing the caustic to melt, when it will adhere to the probe in the form of a drop which retains its shape on cooling. This method is much safer and more economical than the use of solid nitrate of silver by the *porte-caustique*; because in the latter instrument the piece of caustic is apt to break, and the detached particle to drop into the larynx or trachea. Besides, in order to destroy any infectious material from a specific ulcer, the stick of nitrate of silver has to be washed, whereby a great deal of its substance is dissolved and lost. The probe, on the other hand, has but a thin coating of caustic upon its end, which cannot easily break off, and can be readily remelted over the lamp, thereby destroying all infectious material that might cling to it.

## CHAPTER V.

## GENERAL PATHOLOGY AND THERAPEUTICS.

*General Pathology of the Mucous Membrane.*—The mucous membrane lining the throat is, on account of its exposure to the air, exceedingly liable to diseases of an inflammatory character, which exhibit the same phenomena as are noticed in other parts of the body. Such inflammations, accompanied by pain, redness, and swelling, are sometimes *traumatic*, as when caused by the introduction of foreign bodies, the swallowing of corrosive substances, and the inhalation of irritating vapors; or they are idiopathic inflammations. Diseases of the throat may also be results or symptoms of a systemic affection, such as tuberculosis, syphilis, cancer, scarlatina, etc. Finally, they may be of a nervous character, such as the various stages of paralysis of the different parts, and the laryngeal symptoms of hysteria. Then, again, we find the products and consequences of chronic inflammation in the throat as we do in other parts of the body, such as glandular enlargement, catarrhal ulcerations, and neoplasms, in different shapes and locations.

In most diseases of the larynx the secretions from the mucous membrane are altered in quantity and character. They are either increased or decreased in quantity, and either flood the parts or leave them unnaturally dry.

The natural secretion of the mucous membrane, being a watery exudation, keeping the parts moist without being visible as a substance, may in disease become thick and slimy, running together in semi-transparent drops to be collected into larger accumulations and expectorated as mucus. This thickening of the secretions is believed to be due to the admixture of new and old epithelial cells which have undergone a retrograde metamorphosis instead of covering the mucous membrane. Thus the lining of the larynx and pharynx becomes in places denuded of its epithelial covering; such places are called *abrasions*. They are seen to be of a darker color than the surrounding mucous membrane, and appear slightly depressed below the general surface. Such an abrasion will in time develop into an ulcer covered with pus, and presenting a whitish appearance, depressed in the centre and showing raised edges.

From this description it will be seen that a simple inflammation may develop shallow ulcers which are *catarrhal* in their character, and are not necessarily due exclusively to a specific disease of the general system, such as syphilis or tuberculosis, as is taught in most text-books.

#### THERAPEUTICS.

All remedies employed for the cure of throat affections should act first by protecting the parts from the influence of the air, and secondly by stimulating the mucous membrane and its secreting glands to a healthy action. Among these remedies, nitrate of silver stands in the first place as a stimulant and protecting agent.

In the latter capacity it acts first by coagulating the albumen contained in the secretions, and secondly by being partly converted into an insoluble salt of silver, the chloride, through the presence of chloride of sodium in the secretions. In order to obtain the stimulating effect of this remedy, it is necessary to make the solution strong enough to have a surplus of nitrate of silver which is not immediately converted into a chloride or used in the formation of an albuminate.

Almost all the astringents, such as sulphate of copper, sulphate of zinc, tannic acid, alum, and others, are used with advantage both in solutions applied with the brush or sponge or by means of the atomizer, and in the form of powder blown into the larynx by means of the insufflator. They all act more or less as stimulants to the mucous membrane. The vapors of ethereal oils inhaled from the vapor inhalers, such as are contained in tar, cubebs, tolu, benzoic acid, carbolic acid, benzole, etc., are employed for the same purpose.

Alteratives acting upon the secretions of the mucous membrane, and in absorbing swellings, are given internally to aid the topical applications.

*Modes of Administering Remedies.*—Nitrate of silver in solution is applied to the ulcers, abrasions, or centres of inflammation, by means of a soft camel's hair brush, mounted on a stiff bent wire, held in a mirror handle, or by means of a small piece of sponge or tuft of cotton held in the sponge holder or epiglottic forceps. It should never be applied all over the mucous membrane, as is done by the old-fashioned probang. Solutions of not less than 40 grains to the ounce should be employed, and frequently the strength

can with advantage be increased to 60, 80, and even 120 grains to the ounce of water, or water and glycerine. Glycerine alone should never be used as a solvent for the silver salt, as its great affinity for water leaves the mucous membrane unpleasantly dry, and causes a severe burning pain in many persons.

Nitrate of silver in the solid form is applicable only to deep specific ulcerations, and for the corrosion of neoplasms too small for operative interference, or for burning the wound after extraction of a neoplasm, with a view to prevent its return. It is best used by fusing a small piece to the roughened end of a bent silver probe mounted in a mirror handle. After use the lunar caustic coating should be remelted by holding the end of the probe over the lamp, so as to destroy all infectious material clinging to it.

Nitrate of silver is also often advantageously used as an inhalation from the atomizer, either the steam or hand apparatus. When so used, the solution should not be stronger than 10 grs. to the ounce of equal parts of glycerine and water.

The other astringents enumerated may be applied in the form of powder mixed with sugar of milk in various proportions, by means of the insufflator. When so used, they should be rubbed down to an impalpable powder and kept dry. Larger particles of the remedies, if introduced into the throat, act as foreign bodies, and produce more irritation than is desirable. Or they may be applied in solution by the brush, sponge, or atomizer.

Volatile substances are best used for inhalation from the vapor inhalers.



The touching of ulcers or abrasions in the cavity of the larynx or posterior nares is a rather difficult operation. It requires considerable practice for its successful performance, and is to be done in the following way.

After the mirror has been introduced by one hand, the patient himself holding his tongue with his fingers protected by a napkin, and the image of the larynx is in full view, the sponge or brush is introduced with the other hand into the mouth of the patient, until its point nearly touches the image of the ulcer or abrasion in the mirror. The hand is then elevated, thereby carrying the brush downward, but always keeping the image of the ulcer and that of the sponge or brush in a line until the desired spot is reached. After touching the ulcer once or twice lightly, the brush or sponge must be quickly withdrawn, without coming in contact with either the posterior wall of the pharynx or the epiglottis and tongue. If a slight spasm of choking follows, it is easily counteracted by the patient swallowing a draught of cold water.

Remedies are also frequently used in the form of lozenges, that is, they are combined with a fruit paste, generally currant paste, which is pressed into small round or oval cakes. These lozenges are to be slowly dissolved in the mouth, thus impregnating the saliva with the medicine. By swallowing this saliva it comes in contact with the posterior wall of the pharynx and acts upon its mucous membrane.

Among the alteratives which more especially act upon the mucous membrane of the larynx, pharynx, and upon the Schneiderian membrane, are iodide of potassium, bromide of potassium, calomel, cubebs in

the form of smoke from the burning of the crushed berries, of the resin, oil, or the cold fluid extract, and other substances which might be named. The iodide, bromide, and calomel should be given in small doses, and I have found that a combination of the two former is preferable, and can be borne much longer by the patient than either alone.

Acute as well as chronic inflammations of the larynx and naso-pharynx are greatly influenced by counter-irritation such as is used in deep-seated inflammations in other parts of the body. Among them may be named external application of iodine, mustard, croton oil, and fly blisters. In some severe cases especially of œdema of the glottis and epiglottis, leeches applied to the neck are recommended by high authorities, and are often of the greatest advantage in promptly relieving the tension of the parts, and consequent stenosis of the larynx.

Inhalations of ether, chloroform, nitrite of amyl, and other powerful sedatives are employed in nervous affections of the larynx. In chronic tonsillitis local applications of tr. iodinii, tr. ferri chlor., concentrated solution of tannic acid, and solid nitrate of silver are used, but with doubtful results. Lately the injection of iodine solution into the substance of the tonsil has been recommended, but my experience shows that very little if anything is gained in this way.

Many other remedial agents are employed by a variety of methods in treating diseases of the throat; they will suggest themselves to the intelligent observer in special cases.



## CHAPTER VI.

## ACUTE LARYNGITIS.

THE affections of the throat are divided into two distinct classes, which are distinguished by location and anatomical relation of the parts affected. Thus we must consider the diseases of the larynx proper under one head, while the affections of the pharynx and anterior and posterior nasal cavities are to be considered under another. The different members of these two classes, however, intermingle with each other very frequently, and it often becomes difficult to determine to which of the two divisions an affection belongs. But this difficulty is purely theoretical, and does not in the least affect the treatment or prognosis.

For instance, a chronic laryngitis is almost always associated with a chronic pharyngitis, and only by careful examination into the history of the affection can we determine whether to call it a laryngitis or a pharyngitis. To elude this difficulty some authors have adopted compound names, such as laryngo-pharyngitis, or pharyngo-laryngitis, but these appellations have not been generally accepted, and I shall therefore not use them in this volume.

By far the most common of all throat diseases which come under our notice is the acute laryngitis so fre-

quently occurring in childhood and early adult life. It consists in a more or less extended inflammation of the mucous membrane lining the larynx, attended by heat, pain, and swelling, and by general febrile symptoms, such as acceleration of the pulse, increase of bodily temperature, dryness of the skin, loss of appetite, and so on.

*Cause.*—This affection may be of traumatic origin, or may be purely idiopathic.

If *traumatic*, it may be caused by the presence of a foreign body in the larynx, such as a fish-bone, pin, button, etc., swallowed or rather inhaled accidentally, or by the swallowing of corrosive substances accidentally or with suicidal intent,<sup>1</sup> or by the inhalation of acrid vapors or dust. If *idiopathic*, it is caused by a sudden chilling of the mucous membrane, or is dependent upon and a symptom of a general disorder of the system, such as scarlatina, measles, diphtheria, etc., or, finally, it may be caused by external injuries to the neck.

*Symptoms.*—In traumatic acute laryngitis, the symptoms show themselves immediately after the introduction of the irritating substance, and last for some time after the removal of the foreign body, if such be the cause, or, in the case of corrosive substances having been swallowed, until the destruction of tissue has been arrested, and the process of repair is completed.

<sup>1</sup> Primary acute laryngitis is, however, but rarely the result of intentionally swallowing corrosive substances, because the suicide expects to be burned by the liquid, and swallows it quickly; while the person swallowing a corrosive substance accidentally is surprised or startled, and takes an inspiration, thus introducing some of the fluid into the larynx.

In idiopathic acute laryngitis, on the other hand, the symptoms are not developed until some time after the exciting cause has made its impression.

The symptoms in both varieties of the disease are pain about the throat, a feeling of constriction, hoarseness sometimes amounting to aphonia, difficult and painful deglutition, dry and hard cough. Respiration is, however, not usually affected, except when œdema is present. On laryngoscopic examination we find the mucous membrane of a uniform intense red, and somewhat swollen. The pillars and tonsils, as well as the uvula and soft palate, participate in the general hyperæmia.

The epiglottis is generally erect and thickened, and the ventricular bands are so swollen as to sometimes obscure the view of the vocal cords.

The vocal cords are reddened, but are generally of a lighter color than the mucous membrane in their vicinity, so that they can be distinguished from the ventricular bands. The arytenoid cartilages are red and swollen, and appear like balls.

In a few cases these symptoms appear very rapidly, and the swelling of the mucous membrane becomes so great by œdematous infiltration, especially on the epiglottis, ventricular bands, or walls of the *sub-glottic* cavity, as to interfere with respiration, and give rise to very grave symptoms of asphyxia which may result in death if not speedily removed.

*Treatment.*—The ordinary slight form of acute laryngitis without the complication of œdema readily yields to the topical application of astringents by means of the atomizer. Of these a 10-grain solu-

tion of alum, to which is added a drop of the dilute carbolic acid, is perhaps the most satisfactory in its results.

Hot vapor inhalations of tincture of benzoin or balsam of tolu afford relief by loosening the cough.

Internally, saline purgatives, and a combination of iron, chlorate of potassa, and bromide of potassium, should be given. This latter I am in the habit of prescribing in a form such as this:—

R. Tr. ferri chlor.	℥3ij.
Potass. chlor.	3ij.
Potass. brom.	3iij.
Ext. glycyrrh.	3j.
Aquæ dest. q. s.	℥3vj.

Sig. A dessertspoonful in water every 3 or 4 hours. Gargle and swallow.

It has the effect of allaying the irritability of the mucous membrane, and especially of reducing the swelling of the palate and epiglottis, thus diminishing the dysphagia.

Counter-irritation, by means of iodine or mustard applied to the skin over the larynx, should always be resorted to, and very often alone leads to a speedy termination of the affection.

In cases of œdema of the larynx, with consequent stenosis and embarrassment of respiration, there is, as a general rule, no time to wait for the slow action of saline purgatives, counter-irritation, leeches applied to the neck, or venesection, to prevent death from suffocation. A more speedy and efficient method of disgoring the parts of their blood and serous exudation has to be resorted to. This consists

in freely scarifying the mucous membrane by means of a small knife-blade attached to a curved handle and guided by the laryngeal mirror. A more detailed description of this instrument will be found further on (Fig. 23).

By this means the alarming symptoms of suffocation are arrested, and time is gained for the action of astringents, counter-irritation, etc., to effect resolution. If, however, circumstances will not permit of this method being employed, tracheotomy should be at once resorted to, so as to insure perfect oxygenation of the blood. If left until everything else has failed, and the toxic effects of carbonic acid in the blood have progressed too far, a sudden and even complete oxygenation of the blood will not restore the normal condition, and the patient will succumb

Fig. 23.



Tobolt's concealed laryngeal lancet.

to the poison and will be asphyxiated with his lungs full of fresh air.

Ulcers are rarely if ever formed in acute idiopathic laryngitis, while suppuration and the formation of abscesses are often met with. The latter are treated as if situated on the surface of the body. In opening them the knife, which should be a guarded one, is guided by the laryngeal mirror.

Should the inflammation be confined to the mucous membrane of limited parts of the larynx, the affection is designated as *epiglottidis* if the epiglottis is the seat of the inflammation, "*corditis vocalis*" if the vocal cords are affected, and so on.

*Duration.*—The duration of idiopathic acute laryngitis is usually a week or ten days from the first appearance of the symptoms to perfect restoration of health in the parts, but it may frequently be cut short by active treatment, or may extend over two weeks in debilitated subjects. The duration of traumatic acute laryngitis cannot be determined, as it depends upon the extent and severity of the injury received.

#### ŒDEMA OF THE LARYNX.

As has already been mentioned, it happens sometimes that a serous effusion is thrown out into the submucous tissue of the larynx, thus causing a very great swelling of the parts affected. It may occur independently of any disease of the larynx, or as a complication of laryngitis, acute or chronic pharyngitis, acute or chronic tonsillitis, malignant disease of the tongue, epiglottis, etc.



The effusion is usually found in the submucous tissue of the ary-epiglottic folds, at their inner surface, swelling them and the ventricular bands until they touch each other. Next in frequency it is observed in the epiglottis, then in the vocal cords themselves, and rarely in the mucous membrane lining the subglottic cavity.

The symptoms of swelling and stenosis generally appear very rapidly, and if the progress of the effusion is not promptly arrested by scarification of the parts, or the lungs not supplied with fresh air by an external opening in the trachea, a fatal issue of the disease speedily sets in.

Œdema of the larynx or parts of the larynx occurs most frequently in middle-aged persons, although it has been observed in new-born children and in extreme old age. Patients suffering from phthisis or syphilis are more frequently affected; one attack is often followed by another, so much so that Dr. Fauvel, of Paris, is in the habit of supplying patients who have had one attack of œdema of the larynx with tracheotomy instruments, so that in case of an emergency they may be on hand. In many cases, however, the swelling does not completely close the opening of the larynx and trachea, even at the height of the affection, and consequently the dangerous symptoms are less marked. The patient generally complains of a feeling of oppression, pain, and fulness of the throat; and frequently a *barking* cough of a peculiar character is observed—probably due to the swollen parts acting like foreign bodies, and causing the irritation and excitation to cough. If the epiglottis or ary-

epiglottic folds are the seat of the swelling, extreme dysphagia is often experienced by the patient.

On examination with the laryngoscope the mucous membrane is usually hyperæmic, and of a uniform red which is increased to scarlet or even purple over the swollen parts. These are always more or less pear-shaped because the serous effusion gravitates towards the interior of the larynx, and bulges the mucous membrane more below than above. If œdema complicates other throat affections, the characteristics of these will be seen beside the œdematous swellings.

*Treatment.*—The treatment must be directed to the speedy absorption or evacuation of the serous effusion by scarification in severe cases, as has already been described under the head of acute laryngitis, and by counter-irritation, bleeding, and local astringent applications. Among the counter-irritants, mustard plasters and fly-blisters act more promptly than iodine and croton oil when applied to the neck. Bleeding should be accomplished by leeches or cupping, and the general health should be taken into consideration in regard to the amount of blood to be taken. The astringents should be in the form of finely nebulized solutions introduced into the larynx by means of the atomizer, and among them a strong solution (15–20 gr. to the ounce) of alum acts in most cases with great promptness in reducing the swelling; but solutions of tannic acid, chlorate of potash, iron, and others may be used in the same manner with very good results. Nitrate of silver or other caustic applications should not be used, as the spasm following their introduction into the larynx, which



under ordinary circumstances is very slight when only a small ulcer or abrasion is to be touched, becomes severe when a larger surface has to be brushed over. The blood already not being fully aerated because of the obstruction to respiration, if suddenly deprived of a fresh supply of oxygen, even for a few seconds only, becomes surcharged with carbonic acid. A reaction is prevented, and the patient is asphyxiated.

### SUBACUTE LARYNGITIS.

When an acute inflammation of the larynx is subsiding, or when the inflammatory action of the mucous membrane has been from the beginning but slight, we notice what is termed a *subacute laryngitis* which exhibits the following symptoms:—

*Symptoms.*—The patient complains of little or no pain, slight dysphagia, little cough, more marked in the mornings, with a yellow tenacious expectoration, and slight hoarseness of the voice. On laryngoscopic examination the mucous membrane is seen to be redder than normal, with here and there spots of a deeper red; the vessels appear injected, and can be traced for a considerable distance, especially on the free margin and glossal surface of the epiglottis. The pharynx and velum palati are almost always implicated in the general hyperæmia.

*Treatment.*—This stage of inflammation usually disappears in a few days under the treatment which has been adopted for the acute form, and recovery is frequently hastened very much by topical applications, by means of the brush, of solutions of sulphate of

copper, sulphate of zinc, and especially nitrate of silver, to the brighter spots.

*Diet.*—In all cases of acute and subacute inflammations of the larynx, and especially when dysphagia is present, soft food, such as gruels, mush, milk, and beef-tea, and cold drinks should be given. With children, iced milk sweetened with a little sugar is often the only food which can be taken. When the difficulty of swallowing is very great, liquids can often be taken more easily through a glass tube or straw, and soft food can be swallowed by the patient bending the upper part of the body and the head forward.

## CHAPTER VII.

### CHRONIC LARYNGITIS.

#### SIMPLE CHRONIC LARYNGITIS.

IN some cases, especially when the system is below par, and when the acute stage, being very mild, has not been treated, the acute and subacute laryngitis will pass into the chronic stage of inflammation. In phthisis, tuberculosis, cancerous disease, and during the convalescence from continued fevers, when the system is so low as not to react by an acute inflammation, we observe a subacute and then chronic form of the disease. As chronic laryngitis is due to a variety of causes, and as there are slight differences in the symptoms and laryngoscopic appearances of the disease excited by these causes, several forms of

chronic laryngitis must be recognized, and these will be treated of under different heads.

*Symptoms.*—The symptoms of simple chronic laryngitis resemble those of the subacute form of inflammation in many points. The patient complains of a sense of constriction of the throat, but of no difficulty of deglutition, a feeling of dryness of the mucous membrane, and a dry and hacking cough, with white stringy expectoration resembling boiled starch. The voice is usually hoarse, faltering, and easily fatigued, while there exists no embarrassment to respiration. On laryngoscopic examination, we find the mucous membrane to be in a state of hyperæmia with spots of heightened color, the vessels injected, the glands enlarged, and abrasions frequently in the inter-arytenoid space.

This form following acute laryngitis, and caused by a want of tone in the system, is looked upon by some writers as very rare. Its peculiarity consists in the fact that true ulcerations are very rarely found, but that abrasions are frequent.

*Treatment.*—The treatment to be adopted in this form of chronic laryngitis, should be stimulation of the mucous membrane by vapor inhalations of tolu, or of tincture of benzoin, or by astringents in solution introduced by means of the atomizer. The most important feature, however, is the topical application of a 40–60 grain solution of nitrate of silver to the abrasions. These applications should be made to the sores only, by means of a piece of sponge held in the sponge holder, or with the brush, and should be repeated every other day if possible, so as to keep the

raw surfaces covered, and allow the new cells to form under the artificial scab.

Tonics and especially iron are of great service in building up the system, thus aiding in the restoration of health to the mucous membrane of the larynx. A faradic current of electricity applied externally, the poles being placed one on either side of the neck, acts as a local tonic, and is of great benefit.

As a summer resort for such cases, the sea-shore should be avoided, as the dampness of the atmosphere is very apt to increase the swelling of the mucous membrane; in fact we can observe always an increase in the symptoms during easterly winds even when the patient remains in the house. Plenty of fresh air and especially mountain air, on the other hand, is of the greatest benefit, and will, together with good nourishing food, often alone be sufficient to remove all trouble in the throat.

#### LARYNGITIS PHTHISICA.

Another form of chronic laryngitis is found in phthisis and tuberculosis, and as it presents some peculiarities it may be considered under a separate head.

*Symptoms.*—In laryngitis phthisica or tubercular laryngitis we find that the respiration is always more or less hurried, and becomes embarrassed in the later stages. The patient complains principally of a dry, hacking, and painful cough, which later becomes looser and more frequent, accompanied with copious expectoration of greenish or yellowish phlegm. Swallowing is difficult in the earlier stages, and subsequently becomes painful. The voice is always more or less

hoarse and of a peculiar character, and aphonia usually sets in afterwards. On laryngoscopic examination we find the mucous membrane in a state of hyperæmia, which culminates in certain places to form shallow ulcers, especially in the inter-arytenoid space. The color of the mucous membrane throughout is of a peculiar ashy-red, very difficult to describe, but never to be forgotten when once seen. The epiglottis is usually thickened, and often presents abrasions or shallow ulcers on its free margin. The ventricular bands and the vocal cords are more or less swollen and reddened, causing the peculiar character of the voice which we notice in patients suffering from phthisis.

The most characteristic peculiarity of laryngitis phthisica is an abnormal pyriform swelling of the arytenoid cartilages; this is not mentioned in any of the books on the subject, and it is frequently seen in the laryngeal mirror before a physical examination reveals lung implication. The arytenoid cartilages appear very large and rounded at their inner surfaces, tapering gradually toward the side of the larynx until they are lost in the ary-epiglottic fold, their apices entirely disappearing. Often only one of the cartilages is thus tumefied, and it is then generally found that the lung on the same side is affected, while the other lung is still healthy.

In the advanced stages of tuberculosis we find tubercular deposits in the mucous membrane of the larynx, appearing as numerous small round elevations similar to the enlarged follicles which we observe in follicular pharyngitis. The swelling and ulceration of the epiglottis and inter-arytenoid space cause

painful deglutition, and, the irritation being transmitted to the salivary glands, an increased flow of saliva is observed. The ulceration in the inter-arytenoid space, as well as on the vocal cords themselves, often causes painful phonation, and the patient frequently complains of the air inhaled feeling hot, which sensation is due to the irritating action of the air on the raw surfaces.

*Treatment.*—The treatment of this throat affection consists, besides the administration of tonics, cod-liver oil, and alcoholic stimulants, mainly in reducing the irritability of the larynx by painting the ulcerated surfaces with strong solutions of nitrate of silver (60 to 120 grains to the ounce), and in stimulating vapor-inhalations. The bromide salts, and especially the bromide of sodium and ammonium in five- or ten-grain doses given internally, have a very good effect in loosening the cough and in reducing the tenacity of the expectoration. Moderate daily exercise in the open air is of course essential in staying the progress of the disease of the larynx as well as of the lungs. Inasmuch as the laryngeal symptoms are dependent upon the lung affection, the prognosis is, of course, very unfavorable; but by proper treatment the patient can be made very comfortable as regards the laryngeal implication.

#### SYPHILITIC LARYNGITIS.

Secondary and tertiary syphilis show themselves very frequently in the mucous membrane of the larynx, pharynx, and mouth, and are one of the most common causes of chronic laryngitis.



*Symptoms.*—The afflicted patient usually complains of a slight hacking cough, hoarseness, and sometimes of difficult and painful deglutition. On laryngoscopic examination, the mucous membrane is found to be hyperæmic and swollen, with patches of a brick-red color, symmetrical in shape and distribution on both sides of the larynx. *Deep* ulcerations, usually of a round form with raised edges, which have a tendency to run into each other, so as to form larger ulcers of irregular outline, may be found almost anywhere. It is not unusual, in cases of long standing, to find a destruction, by ulceration of part of the epiglottis, of one or both ventricular bands, and even of the vocal cords themselves. Syphilitic gummata or syphiloma are rarely seen in the larynx, while neoplasms of both benign and malignant nature are frequently met with in patients afflicted with syphilitic laryngitis.

The pharynx and soft palate always participate more or less in the general specific inflammation, and form a diagnostic sign warning the laryngoscopist not to use the instruments generally employed, but to use a mirror marked in some way as reserved for specific cases. This caution is of the greatest importance in private practice, as well as in dispensary or hospital work, for practical experience has proved that the disease in certain stages is readily communicated from one patient to another by infectious material clinging to the instruments, even after supposed thorough cleansing.

Signs of specific disease which hardly ever fail are two brick-red, narrow bands of inflammation running along the edge of the velum palati and stopping short

equidistant from the root of the uvula, and a symmetrical distribution, in size, shape, and in position, of brick-red patches of inflammation in the oral cavity.

*Treatment.*—The treatment is mainly directed, as far as the throat is concerned, to the healing of the ulcerations; this may be accomplished, first, by removing the pus covering them with a piece of sponge or cotton dipped in carbolized water and held in a sponge-holder, and then by cauterizing the ulcerated surface with solid nitrate of silver melted upon the end of a silver probe, in the manner described in Chapter IV. If the operator is not very dexterous in the handling of instruments, it is well for him to follow the application of the caustic with a concentrated solution of chloride of sodium, so as to convert the surplus of nitrate of silver into chloride of silver and prevent its action on the healthy parts. The salt solution may be introduced either by means of the laryngeal brush or as a spray from the atomizer. Galvano-cautery also may be employed to cauterize the ulcers, and it has been found in many cases to be even superior to the solid nitrate of silver, causing the ulcers to heal more quickly. A very convenient portable battery is now being made which is sufficiently powerful to raise the platinum electrodes to a very high temperature, and which is admirably adapted for the application of galvano-cautery to specific ulcers in the larynx and naso-pharynx (Fig. 24).

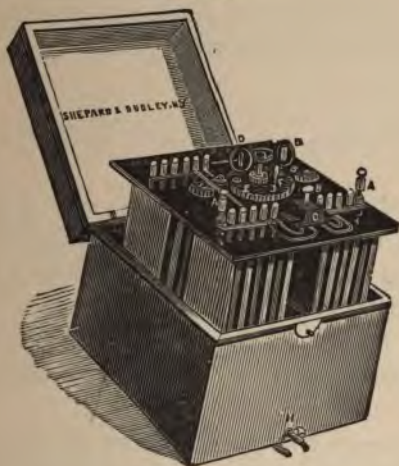
Strong nitric acid has been recommended as an application to specific ulcers in the larynx, but its action is not under the control of the operator, and is therefore a rather dangerous remedy.

Besides the topical applications, the inhalation of



carbolic acid solution from the atomizer is strongly to be recommended, while the exhibition of iodide of potassium and of mercury must never be omitted in our efforts to stay the progress of the disease.

Fig. 24.



Galvano-cautery battery.

Fresh air, cod-liver oil, nourishing food, and tonics are not to be forgotten while endeavoring to keep up the strength of the system. Warm salt baths two or three times a week, as well as an occasional Turkish bath, are very beneficial.

The prognosis regarding the affection of the throat is rather favorable if the destruction of tissue has not gone too far; and patients in whom one of the vocal cords has been destroyed have been known to regain the voice. In such cases the ventricular band of the same side takes upon itself the action of the

lost vocal cord, and meets the cord on the opposite side to form the rima glottidis and produce a vocal sound.

There are also cases on record in which the greater part of the epiglottis has been eaten away by specific ulceration, and in which, after the ulcerated edge has healed, no difficulty of any account has been experienced by the patient in deglutition.

#### TRAUMATIC CHRONIC LARYNGITIS.

The inhalation of acrid vapors or dust incidental to many occupations, as well as the accidental introduction into the larynx of foreign bodies which remain there for some time, will produce a chronic laryngitis, which, on account of the causes being purely external, may be termed traumatic chronic laryngitis.

*Symptoms.*—When acrid vapors or dust are the exciting cause, the patient complains of a burning sensation, together with great dryness and fulness of the larynx, which cause him to clear his throat continually. A slight hacking cough is usually present. The expectoration, which is very scanty, and resembles cooked starch in consistence, is either grayish-white or stained with dust, and is apt to fly out of the mouth with considerable force in the shape of small pellicles when the throat is cleared. Where foreign bodies imbedded in the tissue of the larynx cause the affection, the sensation is that of a localized pain increased in the act of swallowing, together with a feeling of dryness and fulness of the throat.

On laryngoscopic examination we find the appearances noticeable in simple chronic laryngitis.

*Treatment.*—The treatment must of course be directed towards removing the cause of the trouble by extracting the foreign body if one be present, or by advising the patient to change his occupation; or, if that be not possible, by telling him to breathe through a moist sponge or respirator while working in an atmosphere filled with dust. If the vapors of acids be the cause, the sponge should be frequently moistened with lime-water or a strong solution of carbonate of soda.

As in the other forms of chronic laryngitis, exercise in the fresh air, good nourishing food, and topical applications of nitrate of silver or astringents to the abrasions, as well as stimulating inhalations, should be employed to counteract the effects of the irritating causes of the affection, and to restore the mucous membrane to its normal condition.

As a preventive against acute as well as chronic laryngitis, the patient should be advised to bathe the throat morning and evening with *cold* water or cold salt and water, and not to wrap shawls and furs around the neck when going out into the open air. Nothing more predisposes persons to throat affections than this habit of keeping the neck warm. It interferes with the exhalation of the skin and makes it tender.

## CHAPTER VIII.

## PHARYNGITIS.

PHARYNGITIS is an inflammation of the mucous membrane lining the pharynx, and like laryngitis is divided into two larger groups, the *acute* and *chronic*. These are again separated into subdivisions according to the causes producing the inflammation, and according to special features characteristic of the different forms.

## ACUTE PHARYNGITIS.

Acute pharyngitis is found in connection with acute laryngitis and usually precedes it, the velum palati, the pillars, and tonsils participating in the general inflammation of the mucous membrane. This condition is the so-called sore throat so common among children as well as adults.

*Symptoms.*—This affection is usually caused by wet feet, an exposure to cold draught, etc. It is ushered in by a more or less pronounced chill. Febrile symptoms then begin to show themselves more or less severe according to the effect produced by the exciting cause upon the general system. The throat feels raw, swollen, and painful, deglutition becomes painful and difficult on account of the swelling of the tonsils and uvula, and a thick, yellowish expectoration is thrown out. In the first stages there



is usually little or no cough, but later, when the inflammation has extended into the larynx and perhaps even into the trachea, the cough becomes very harassing. The lymphatic glands under the jaw and in the neck usually participate in the general inflammation and become swollen and painful to the touch.

On inspection of the pharynx, which is easily effected by depressing the tongue by means of a tongue-depressor, we find the anterior pillars red and swollen, and the tonsils of a purple hue protruding beyond the anterior pillars, thus hiding from view the posterior pillars of the fauces. Frequently small white patches of cheesy consistence easily removed with a probe, but leaving no ulcerated surface underneath them, are observed on the tonsils, especially on the posterior surface. These patches are the hardened secretions of the follicles of the glands pressed out by the swelling of the organs. They differ, however, from pseudomembranous patches as seen in diphtheria, inasmuch as they are usually smaller, of different consistence, and leave no ulcerated or raw surface when removed. But they are frequently mistaken for diphtheritic exudations, and the affection is then after a hasty and superficial inspection called diphtheritic sore throat. It sometimes occurs that these cheesy patches are mistaken for the pus-covered surfaces of ulcers, and the patient is then subjected to severe treatment in order to heal up the supposed ulcers.

The velum palati is uniformly reddened and swollen, while the uvula is generally relaxed and hangs down into the pharyngeal cavity. The wall of the pharynx is seen to be bright red, with prominent veins fully

injected ramifying over its surface. The free margin of the epiglottis is usually swollen from the first.

*Duration.*—The duration of this affection is usually of a few days only, when the swelling and inflammation subside, and the normal condition of parts becomes re-established; if, however, the larynx is affected to any extent, the disease is prolonged by this complication, and may continue as an acute laryngitis after the inflammation of the pharynx and tonsils has subsided. But this is not usual, and does not occur in vigorous subjects, or when proper and active treatment has been adopted from the beginning of the affection.

*Treatment.*—The treatment should be directed to the removal of the general febrile symptoms, and to hastening the resolution of the local inflammation, as well as to the alleviation of the pain.

Saline purgatives, hot foot-baths, and sponging the body with tepid water or whiskey and water, should first be resorted to, and the diet reduced to milk, mush, gruels, and, if necessary, beef tea. All articles of food should be soft, and of the mildest nature. Spices, even in very small quantities, aggravate the local symptoms. Frequently the tumefaction of the parts is so great as to make the act of deglutition almost impossible; then only iced milk or oyster soup can be swallowed in very small quantities, and the thirst must be alleviated by small pieces of ice held in the mouth.

In this affection only are gargles of any use. They can be easily brought into direct contact with the parts most affected, namely, the soft palate with the uvula, the posterior wall of the pharynx, the tonsils, and

pillars. Strong solutions of alum, tannic acid, iron, and other astringents should be employed in the form of gargles in combination with some anodyne, or the parts should be irrigated with them by the spray from the hand atomizer, or they may be painted with a brush over the surfaces most inflamed. Solutions of nitrate of silver applied to the apparent centres of inflammation act with great promptness in reducing the swelling. An attack of this kind can frequently be cut short or prevented altogether by the early use of this remedy. Vapor inhalations of carbolic acid, benzoin, tar, etc., are also very advantageous. Internally, the mixture of iron, chlorate of potash, and bromide of potash, recommended in the treatment of acute laryngitis, has been found to give the most satisfactory results in allaying the irritation. Poultices of various substances applied externally to the neck tend to keep the skin soft and pliable, thus diminishing the painful pressure upon the enlarged glands. If the inflammation has been very severe, and the swelling very great, suppuration and ulceration will occur.

One attack of acute pharyngitis predisposes the patient to other attacks of the same kind, and we frequently have occasion to observe the great regularity with which the affection returns once or twice a year in the same person. It has been found that bathing the throat with cold water every morning and evening throughout the whole year, and hardening the skin against atmospheric influences by moderate exposure, even in cold weather, will frequently break up the tendency to acute pharyngitis and tonsillitis; while the local application of a strong



solution of nitrate of silver will ward off an attack even when the first symptoms have already made their appearance.

#### TRAUMATIC ACUTE PHARYNGITIS.

As has been said, the common cause of the affection is exposure to cold, but the accidental or intentional swallowing of corrosive or very hot liquids will produce the same results, as well as the imbedding of sharp foreign bodies in the tissues, such as fish bones, splinters of bone or wood, pins, etc. In the latter case the inflammation starts from a point of irritation spreading over the whole mucous membrane covering the parts in the neighborhood. The first step in the treatment should of course be the removal of the offending body.

An acute pharyngitis without involvement of the soft palate and the tonsils is exceedingly rare, and is only found when the irritation has started in the pharynx and has not had time to advance to the parts above. It was, therefore, necessary to describe two affections together, viz., acute pharyngitis and acute tonsillitis, which are differentiated from each other by their names only, while not different in reality.

The chronic forms of these two affections, on the contrary, differ widely from each other, both as regards their causes and the symptoms which they present; they will therefore be considered separately.

#### CHRONIC PHARYNGITIS.

The chronic forms of pharyngitis, like those of laryngitis, must be considered under different heads

They are to be distinguished from each other, either by the causes of the affection or by one or more distinctive symptoms, that is to say, features peculiar to one form and absent in all others.

The simple form of chronic pharyngitis is an affection very common among all classes of patients, and especially in large cities. It is usually unheeded by the patient, unless its symptoms become very marked, and its time of duration cannot be determined because its beginning is not noticed.

*Symptoms.*—The patient thus affected complains chiefly of a dryness in his throat, which causes him to swallow saliva constantly in order to moisten the parts. In the morning he is obliged to clear his throat with more or less effort, and expectorates a viscid, white mucus. There is usually a slight dry tickling cough present, of a rather nervous character. No other subjective symptoms are, as a rule, complained of.

On inspection, we see the soft palate and tonsils in a normal condition; the posterior wall of the pharynx, however, is dry and shiny, with here and there a small injected vessel running across its surface. The epiglottis, as well as the larynx itself, is usually normal.

*Cause.*—The causes of this affection are extremely various, and it is difficult to name any single one as producing it. The chief cause, however, in my opinion, is the inhaling of impure and foul air in crowded and badly ventilated rooms, and of the dry furnace air used in cities for warming dwellings and public buildings. Anything tending to reduce the

vital forces of the patient, especially alcoholism, masturbation, and venereal excesses, will be found frequently to cause simple chronic pharyngitis in an indirect manner, and aggravate the symptoms when the affection is already in existence.

*Treatment.*—The treatment must consist in building up the system and in stimulating the mucous membrane of the pharynx to healthy secretion, which is, however, not so easily accomplished as it might seem to be. In fact, chronic pharyngitis resembles very much the indolent leg ulcer, which often refuses to change its character in spite of all treatment. The hygienic treatment, which is the same for all forms of chronic pharyngitis, consists mainly in moderate exercise in fresh air; in thorough ventilation of the rooms inhabited, and especially of sleeping apartments; in the administration of tonics, such as quinine, iron, phosphorus, etc.; and in cautioning the patient against the evil consequences of masturbation, venereal excesses, and intemperance.

Locally, frequent applications of a moderately strong solution of nitrate of silver (forty grains to the ounce), painted over the shiny and dry surface of the pharynx with a soft camel's-hair brush, or of a ten-grain solution in dilute glycerine, introduced by means of the atomizer, will gradually change the character of the mucous membrane in many cases. Some cases, on the other hand, improve more rapidly under the exhibition of astringents, such as tannic acid, sulphate of copper, etc., applied by the brush or atomizer. The excessive dryness is somewhat relieved by the use of benzoic acid lozenges made

according to Mackenzie's formula. Internally, the resin oil of cubebs or the cold fluid extract of the same drug in ten-drop doses on sugar, three times daily, aids very much in altering the secretions of the mucous membrane. Better still is the effect of small doses of bromide and iodide of potash in combination, which render the tenacious mucus more watery, and therefore enable it to be more easily expectorated.

The judicious use of a faradic current of electricity, or even galvano-puncture, has been recommended in these cases, and I have found that this means is a powerful agent in changing the indolent inflammation into an active one. In using the faradic current, both poles should be applied to the pharyngeal mucous membrane a short distance apart, taking one area after another into the circuit until the whole surface has been gone over.

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## CHAPTER IX.

### PHARYNGITIS. (CONTINUED.)

#### FOLLICULAR PHARYNGITIS.

FOLLICULAR pharyngitis is a form of chronic inflammation of the pharyngeal mucous membrane in which the follicles are seen to be enlarged and to form small eminences on the surface of the pharynx. These follicles are exceedingly numerous, and when irritated secrete a thick whitish liquid which is seen clinging to the wall of the pharynx in long strings.

*Symptoms.*—The symptoms complained of by the patient are a feeling of fulness, dryness, slight cough, and a thick tenacious phlegm which cannot easily be expectorated except after prolonged hawking. On inspection the mucous membrane is seen to be of a light reddish-gray color, while the little enlarged follicles are of a deeper red. Injected vessels are observed running over the dry and shiny surface of the posterior wall of the pharynx.

*Treatment.*—The exciting causes being the same in this form as in simple chronic inflammation of the pharynx, the treatment also is nearly the same. The only variation is that a stronger solution of nitrate of silver should be used, and that the enlarged follicles alone should be touched with it.

It has been recommended to cut out or rather to make an incision into the enlarged follicles, but unless they are suppurating, an occasional incident, very little is gained by such an operation, which is very tedious both for the patient and the operator.

#### GASTRIC PHARYNGITIS.

The same symptoms and appearances of the parts affected are observed in what is called gastric pharyngitis.

*Symptoms.*—The patient complains of dryness, fulness, and frequently rawness of the throat, together with a slight cough of a more or less nervous character, and with a tough tenacious expectoration of whitish or yellowish color.

On inspection we see the mucous membrane of the pharynx reddened, dry, the vessels injected, the follicles more or less enlarged, but never so numerous as



in follicular pharyngitis, and long strings of mucus covering the surface of the pharynx; and in aggravated cases we see abrasions or even superficial ulcers most frequently below the level of the tongue.

*Cause.*—The cause, as the name implies, is to be looked for in a deranged digestion. The eructations after eating bring the acrid secretions of the stomach in contact with the delicate mucous membrane, and cause an irritation. The same effect is produced by the eructations of gas, mainly composed of carbonic acid, which we so frequently find in dyspepsia.

*Treatment.*—The treatment must of course be directed to removal of the cause, by reducing the acidity of the gastric secretions through the administration of antacids, by endeavoring to remove the gastric irritability, and by building up the system with tonics, among which, in these cases, cinchona and the vegetable bitters are preferable to iron and its compounds.

In many cases no local treatment is required, and the pharyngitis improves with the digestion. When abrasions or ulcers are present, however, they should be healed up by topical applications of nitrate of silver or sulphate of copper, and stimulating inhalations of vapors or astringent solutions in the form of sprays from the atomizer should be used.

### GRANULAR PHARYNGITIS

Is another form of chronic pharyngitis in which again we find the symptoms and appearances already described, in which, however, the chief distinctive elements are a granular thickening of the mucous membrane of the pharynx, and laryngeal complica-

tion, that is we have a chronic laryngitis together with the chronic pharyngitis. This form is known under the names of granular pharyngitis, clergyman's sore throat, speaker's sore throat.

*Cause.*—Its cause lies in a faulty use of the voice, or in abuse of it; but, in order to comprehend how such a factor can produce such results, we must look into the mechanism of the production of the voice.<sup>1</sup>

We find that the voice is divided into what are called registers, which divisions are produced by alterations in the vocal cords themselves, so as to relieve the pressure brought to bear upon them, both by the muscular contraction stretching them and by the force of the current of air from the lungs. If we examine a larynx in the act of phonation and ask the patient to raise the pitch of his voice until one of the limits of the register is reached, we will see a slight redness or congestion of the cords if the same position and tension of the cords is persisted in, and if the same amount of vibrating surface is exposed to the air current. This congestion of the cords becomes more and more extended the higher the patient sings with the same register mechanism. The cords are thereby much more tightly stretched, and by the influx of blood are made heavier, requiring a greater amount of air force to set them into vibration. As soon, however, as the unnatural and excessive tension is removed, the congestion disappears, and the cords resume their pearl-white color. If this transgression of the natural limits of the registers is frequently re-

See "Voice in Singing," by E. Seiler: J. B. Lippincott & Co., 1875.



peated, the congestion of the cords does not disappear but becomes chronic and spreads to the neighboring mucous membrane, while the undue force of the air current, striking the parts above when in their peculiar positions for articulation, produces an irritation and congestion of the pharyngeal mucous membrane.

Men speak in the two-chest registers, constantly using either the upper or lower according to the requirements of proper intonation. Women speak in the falsetto, but laugh and scream in the head register. Public speakers, in order to make themselves heard in a large hall, often strain their voices, that is, they force an extra amount of air through the rima glottidis, and in doing so contract the large muscles of the neck — the sterno-cleido-mastoid, the sterno-thyroid, and thyro-hyoid.

The contraction of these muscles fixes the larynx, and prevents its participation in the vibration of the column of air above and below it, and also interferes with the free action of the muscles of the larynx proper. This gives rise to an extra expenditure of muscular force, and a consequent feeling of fatigue after a few minutes of speaking or reading aloud.

The unnatural intonation used by public speakers, and especially by preachers, which consists in drawing the vocal tone of the vowels over a considerable part of the scale, thereby transgressing the natural limits of the registers, adds not only to the expenditure of muscular force, and is a consequent source of fatigue, but also increases the already existing congestion of the cords and neighboring mucous membrane. If then, after such abuse of the vocal organs

for a time, the preacher or public speaker exposes himself to sudden changes of temperature, the congestion is very apt to turn into inflammation, which speedily becomes chronic, and the patient attributes his affection to this exposure after use of the voice.

*Treatment.*—The treatment as regards remedial agents is the same as in ordinary chronic laryngitis and pharyngitis, and will effect a cure of the disorder provided the patient does not use his voice more than absolutely necessary for ordinary conversation. As soon, however, as he resumes his work as preacher or lecturer, the symptoms return speedily, and in a short time his throat feels as sore as ever. We must, therefore, in treating such cases, add another factor to our treatment, viz., training and cultivation of the voice in speaking.

In order to do this, the patient must first be taught to sing up and down the scale, so as to learn to recognize the limits of the natural registers, and learn not to transgress them in singing or in speaking. He then must be taught to pronounce the sounds of articulate speech with the proper position of the organs, the larynx, soft palate, lips, and tongue, using as little breath as possible. He must further be instructed not to change the pitch of his voice on any one syllable, but in order to produce a rise and fall in the voice, to make the change on different syllables, that is, not to draw the vocal tone over.

It will be found that the patient, when he has acquired the natural way of speaking, can fill a larger hall or church with less exertion, and can speak for any length of time without feeling fatigued, except from his mental effort and from standing for an hour

or so. A more definite description of this portion of the treatment cannot be given, because every case requires a careful study of its own peculiarities, which suggest different expedients to attain the desired result, to be chosen with regard to the mental capacity of the patient, and to be under the direction of an intimate knowledge of the mechanism, both of the production of the voice alone and of articulation.<sup>1</sup>

The practice should be repeated as often as possible, and should not be extended over a period of more than fifteen minutes at one time in order not to fatigue the patient.

#### SPECIFIC CHRONIC PHARYNGITIS.

Secondary as well as tertiary syphilis produces a form of chronic inflammation in the mucous membrane of the throat, which has sufficient distinctive features to entitle it to be considered under a separate head.

*Symptoms.*—The patient complains usually of a slight cough with thick yellowish but scanty expectoration, of a fulness and dryness of the throat, and of more or less hoarseness of the voice. Often difficulty of deglutition is complained of, and frequently articulate speech has a nasal quality. On inspection we find the mucous membrane of the pharynx, soft palate, uvula, and tonsils of the peculiar brick-red hue already described under the head of Specific Laryngitis. The pharynx is dry and glistening, and ulcers more or less deep, of a rounded outline, with raised edges, and sur-

<sup>1</sup> See "Voice in Speaking," by E. Seiler: J. B. Lippincott & Co., 1875.

rounded by a zone of more active inflammation may be found almost anywhere. They are, however, most frequently seen on the pharyngeal wall, the soft palate, the pillars and tonsils, and often on the tongue. Symmetrical patches of more active inflammation are almost always seen in specific inflammations of the throat, and form one of the distinctive features of this affection.

Gummata or syphilomata are often observed on the posterior wall of the pharynx, and may be recognized by their peculiar elasticity to the touch of the sound. An adhesion of one or both posterior pillars to the pharynx is also frequent, and is caused by cicatricial tissue resulting from the healing of ulcers. These features are so peculiar that when once seen they will always be recognized, and a confirmation of the diagnosis by the history of a primary sore is frequently unnecessary.

*Treatment.*—The treatment of the local affection must consist in stimulating the mucous membrane so as to remove the dryness and swelling, and in healing up the ulcerations if such are present. This is done by cauterizing them thoroughly with nitrate of silver carried on the end of a silver probe, or by galvanocautery, after the pus covering them has been removed with a piece of soft sponge moistened with carbolized water and held in a sponge holder. It frequently occurs that these ulcers perforate the velum palati or even the hard palate, and then the peculiar nasal twang of the voice is heard. The progress of these perforations may be stopped by cauterization, but they cannot be closed except by a plastic operation when the edges have healed, or by fitting a plate with an elastic flap over the perforations.



The constitutional treatment must of course not be omitted, for no amount of local applications will eradicate the disease. I have, however, found that iodide of potassium in small doses is preferable to mercury in these cases, and I am in the habit of always giving the iodide of potassium in combination with bromide of potassium, because the one seems to enhance and at the same time control the action of the other, so that they can be taken for a longer time in combination than when given separately, before producing a disturbance of digestion and eruption on the skin. A dose of from three to five grains of the iodide of potassium and ten grains of the bromide of potassium given three times a day is often borne for months without signs of iodism. The ulcers in the throat heal rapidly and the mucous membrane assumes its normal condition under such treatment.

The general health of the patient should at the same time be attended to by the administration of tonics, cod-liver oil, and salt baths, and he should be advised to take exercise in the fresh air.

#### TRAUMATIC CHRONIC PHARYNGITIS.

After the ulcers or the acute inflammation produced by the accidental swallowing of hot or caustic liquids, causing acute traumatic pharyngitis, have passed away, a chronic inflammation of the mucous membrane is frequently left behind, which exhibits the same symptoms and appearances of the parts as have been described when treating of simple chronic pharyngitis. The treatment required for this form does not differ from that for other forms of the disease.

## CHAPTER X.

## DISEASES OF THE NASAL CAVITIES.

THE Schneiderian membrane and the mucous membrane lining the posterior nasal cavity are much more frequently the seat of acute and chronic inflammations than any other part of the mucous tract.

## CORYZA.

An acute inflammation of the nares which is called *coryza*, or cold in the head, exhibits the well-known symptoms of, first, a feeling of fulness in the nose, which gradually ascends into the forehead, producing there a dull frontal headache. An irritation of the mucous membrane then shows itself by frequent sneezing, and finally resolution of the tumefaction sets in, causing an excessive discharge of mucus more or less watery.

Constitutional disturbances show themselves by general languor and slight febrile symptoms more or less pronounced in different individuals, and varying with the severity of the local inflammation.

On inspection of the anterior as well as posterior nasal cavities, which however is rarely ever made except for the sake of study, the mucous membrane will be found to be swollen and intensely red, the swelling frequently obliterating the convolutions of

the turbinated bones. Abrasions or ulcerations are entirely absent in a simple coryza.

The frontal headache is produced by the tumefaction of the mucous membrane lining the frontal sinuses, obliterating the communicating aperture between them and the nasal cavity, thus shutting off the outlet for the secretions, which in producing pressure upon the distal ends of the nerve fibres causes the pain.

*Cause.*—This affection is caused either by a sudden chilling of the surface of the body or by local irritation of the mucous membrane through the inhalation of acrid vapors or particles of dust. Among the former, *osmic acid* is peculiarly rapid in its action, producing an active coryza in from one to two hours after the exposure to its acrid fumes.

The duration of the affection is, as every one knows, a few days. It generally disappears within nine days from the advent of the first symptoms.

*Treatment.*—In regard to the treatment of this affection very little is to be said, inasmuch as every one agrees that nothing can be done to shorten or stop the symptoms when once fully established, and therefore the disease is usually left to run its course. If, however, the irritation becomes so great that the patient is compelled to sneeze incessantly, protection of the irritable mucous membrane from the air is very grateful to the patient. This may be accomplished by a snuff composed of gum acacia, subnitrate of bismuth, bicarbonate of soda, and a little sulphate of morphia. The gum arabic coming in contact with moisture forms a paste which is made still more protecting to the mucous membrane by the bismuth



when introduced into the nostrils as a snuff. The soda is added to prevent acid fermentation, and the morphia to lessen the sensibility.

Bromide of potassium given in doses of 15-20 grains every three or four hours hastens resolution somewhat in a great number of cases, while in others it seems to have no effect. The fumigation of the mucous membrane by muriate of ammonia vapor from the inhaler described in Chapter III., and also by vapors of volatile substances, such as balsam of tolu, tincture of benzoin, carbolic acid, etc., frequently hastens resolution and reduces the irritation, thus making the patient more comfortable.

Abortive treatment is, however, often successful if commenced in time. The remedies employed to cut short a cold in the head are, inhalation or rather fumigation with iodine in the form of the tincture, which must be used directly after the exposure to the cause, hot stimulating drinks, such as hot whiskey punch, a remedy which is used in every household to avert a cold of any kind. Its action is supposed to consist in an equalization of the disturbed capillary circulation on the surface of the body. In doing this it prevents a local congestion and inflammation. If, however, the congestion has already set in, alcoholic stimulants will aggravate it.

But even then a cold in the head can be aborted in many cases by the use of the nasal douche, using the water at a temperature a little above blood heat and adding to it some astringent together with common table salt.

*Nasal Douche.*—As the nasal douche is constantly employed in the treatment of acute and chronic in-

inflammations of the lining membrane of the nasal cavity, I will here say a few words in regard to the proper use of this instrument.

The nasal douche (Fig. 51) is a vessel either of glass or tin, holding from 8 to 16 ounces of water, and having near its bottom a spring. This spring is in connection with a rubber tube that can be con-

Fig. 51.



The nasal douche.

end with a nozzle of glass, rubber, or wood, as directed so as to fit the nostril. The vessel being filled, and the nozzle introduced into one of the nostrils of the patient, the water by gravitation runs up the one side of the nose until it reaches the posterior surface of the velum palati closing the nasal cavity behind, and runs out by the other nostril, thus washing the mucous membrane, and cleaning it by removing all hardened mucus, either directly or by loosening it so that it can be removed afterwards by blowing the nose.

There are, however, certain precautions necessary in using the nasal douche, which if disregarded, may be very unpleasant results, and there are a few cases in which a fatal inflammation of the brain has been at-

tributed solely to the use of this instrument. Dr. Roosa of New York, as well as Dr. M. Browne of London, records cases of severe inflammation of the middle ear, caused by the nasal douche, and they consequently condemn this instrument as dangerous and of little use. On the other hand, Dr. L. Elsberg of New York, and many others, among them the author, have never met with a case of injury resulting from the use of this instrument, where the precautions to be mentioned had been observed by the patient. Dr. M. Browne does not seem to lay much stress upon the proper density and temperature of the liquid, and this may be the cause of the unpleasant symptoms he observed in many cases following the use of the nasal douche. If, however, the precautions are closely observed, not only will there be no unpleasant effects following the use of the instrument, but on the contrary the patient being pleased with its action is not willing to do without it.

*Precautions in the Use of the Nasal Douche.*—In the first place, the bottom of the vessel should, under no circumstances, be elevated more than an inch or so above the eyebrows of the patient, as otherwise the pressure is so great as to force the water into the frontal sinuses or into the Eustachian tubes, giving rise in the first instance to intense frontal headache, and in the second, to an inflammation of the mucous membrane of the middle ear.

The temperature of the liquid should be raised in the vessel to slightly above blood heat, so that after it has run through the tube, and has thereby lost some of its heat, it will feel neither hot nor cold to the parts.

Furthermore the liquid used should be of the same

density or specific gravity as the serum of the blood. The congested capillaries being near the surface of the mucous membrane, while the liquid is on the other side, only a thin wall of epithelial cells separates them, and thus the most favorable conditions for osmosis are presented. If the liquid used in the nasal douche be of a greater specific gravity than the serum of the blood, exosmosis of the latter will take place, leaving the corpuscles more densely crowded in the capillaries, thus clogging them, and producing an irritation of the sensory nerve filaments, which we perceive as a burning pain. If, on the other hand, the liquid is of less density than the serum of the blood, endosmosis will occur, and the capillaries will be distended with the increase of liquid which again causes pain by excitation of the nerve filaments. It becomes therefore necessary to use in the nasal douche a liquid which is like the serum of the blood in density as well as in temperature. Such a liquid may be obtained by mixing about 56 grs. of salt with a pint of water. Dr. J. G. Richardson, while engaged in his investigations on blood stains, found that a solution of 56 grains of salt in a pint of water produced a liquid in which blood-corpuscles became neither crenated nor swollen, as they do when suspended either in a heavier or lighter liquid than serum, and he consequently used such a liquid with very satisfactory results. For practical purposes it is, however, sufficient to make the liquid to be used in the nasal douche, by adding an even teaspoonful of salt to a pint of water at 100° F. To this may be added any astringent, stimulating, or disinfecting solution, provided the chloride of sodium does not produce a chemical change therein, as

would be the case with nitrate of silver, and provided also that the specific gravity of the liquid be not materially changed by the addition of other substances.

Several forms of the nasal douche are in the market, some of which have great disadvantages and are therefore to be avoided: for instance, the bottle form, which is most generally sold (Fig. 25). The narrow mouth of the bottle makes it inconvenient to introduce the salt, and impossible to use a thermometer to test the temperature, while it also prevents a thorough cleansing of the vessel. The glass tube at its bottom to which the rubber tube is attached is easily broken off, and then the instrument is useless. Furthermore, it is too expensive an apparatus for the use of the poorer class of patients.

Another form, called the pocket or siphon nasal douche (Fig. 26), is very convenient and efficient in the hands of an intelligent patient, but almost useless in the majority of cases, inasmuch as it is nothing

Fig. 26.



Siphon nasal douche.

but a siphon which must be started in order to work. It consists of a rubber tube with a nozzle at one end and a weight attached to the other. The weighted end is sunk into the vessel containing the salt solu-



tion, which is elevated to the proper height; the air is then sucked out of the tube and the current thus started. In using this siphon-tube it is always necessary to keep the free end a little below the level of the weighted end.

The form of nasal douche which will be found most satisfactory, durable, and at the same time inexpensive, consists of a pint tin cup with a piece of tin tube soldered in a hole cut near the bottom of the cup, to which the rubber tube is attached. The nozzle at the free end of the tube is made of hard wood soaked in paraffine or of horn. This form of douche cannot be broken, is easily kept clean, the temperature can be accurately measured, and it costs so little that even the poorer patients can afford to use it.

Before the introduction of the nasal douche by Professor Thudichum, a syringe made of rubber, with a curved nozzle, called the *Post-nasal Syringe* (Fig. 27), was used for the introduction of medicated solutions into the post-nasal cavity, and this instrument

Fig. 27.



The post-nasal syringe.

is frequently of great advantage at the present day in cases where one of the nostrils is obstructed by tumors or a bulged septum, and in cases where strong astringent and stimulating solutions are to be employed, or in cases where the crusts of hardened mucus fail to become loosened and washed away by the gentle

stream of the nasal douche. In the latter cases the nozzle of the syringe should have a slit-like opening instead of the usual five or six small holes, because greater force is necessary to dislodge the crusts.

The introduction of the post-nasal syringe is, however, somewhat difficult, inasmuch as the nozzle has to be brought up behind the soft palate, and it should therefore not be trusted to the patients, although they often do learn to use it on themselves. After the nozzle has been brought up behind the soft palate, the patient is directed to keep his mouth open and bend his head over a basin so that the stream of liquid shall pass out of both nostrils and not regurgitate back into the mouth.

We are now prepared to return to the consideration of the diseases of the nasal cavities, and will take up another form of acute inflammation of the lining mucous membrane of both the anterior and posterior nares, viz., hay cold.

### HAY COLD.

During the summer months many persons in this country are affected by a coryza which recurs with great regularity on the same day of the year, but varying in regard to time with different individuals. It is called, according to the time of the year when it occurs in different persons, Rose cold, Hay cold, Peach cold, and so on.

*Symptoms.*—The symptoms are those of an ordinary coryza of an aggravated type, the pharynx and larynx usually participating in the irritation. It is generally ushered in by a slight chill, followed by fever, fre-



quent and violent sneezing, especially in the morning, slight cough with little expectoration, swelling and redness of the mucous membrane lining the nasal cavities, and a copious discharge from the nostrils of watery mucus, requiring the constant use of the handkerchief. The swelling gradually extends to the frontal sinuses and also to the external integument of the nose, more or less implicating the eyes and the whole face. In many cases paroxysms of an asthmatic character are observed, and a dull frontal headache is present to a greater or less degree in all cases.

The affection generally lasts from three weeks to two months, those cases occurring in the early part of summer being of shorter duration than those occurring in autumn, which invariably are suddenly terminated with the appearance of the first light frost.

The immediate causes of this affection are not as yet understood, but it is believed that certain vegetable spores which float in the air become deposited upon the mucous membrane and cause the irritation. This theory is supported by the fact that persons affected with summer cold are entirely free from it in certain localities, and always on the open sea, the affection returning with the change of locality or with a proximity to the shore of less than one hundred miles. Furthermore the treatment based upon this theory is usually more effective than any other.

The fact that only a few persons are thus affected by external influences, whatever they may be, while others do not suffer at all, must be explained by the existence of an idiosyncrasy. This seems the more likely, when we examine such cases of idiosyncrasy,

in which certain substances when eaten even unconsciously produce certain symptoms, frequently of a toxic character. I recall a case in which a lady was immediately attacked by violent sneezing followed by a coryza of several days' duration, when buckwheat in any form was brought near her, even without her knowledge.

The different names of the affection were given to it because some persons suffer from it when the roses are in bloom, others when hay is being mown, and still others when the peaches are ripening. On the continent of Europe very few cases are observed, while, on the contrary, in this country a great many suffer from this peculiar affection, and persons having the disease here are usually free from it when abroad.

*Treatment.*—The treatment consists chiefly in protecting the Schneiderian membrane from the influences of the air, and in reducing the pain dependent upon the swelling. This can be done by the frequent snuffing of a powder composed of gum acacia, quiniæ sulph., bismuthi subnitras, and a little morphiæ sulph. The nasal douche is to be used two or three times a day, employing carbolized water, so as to remove all irritating substances that may by their presence cause the inflammation. Sneezing should be prevented by pressing the forefinger hard against the lower edge of the septum of the nose, or by smelling at a bottle containing rather strong ammonia. The nose should never be blown hard, but only wiped when necessary, because both sneezing and blowing the nose increase the irritation of the mucous membrane by forcing a powerful current of air through the nasal cavities. Quinia should be given internally, as much as can be

borne without producing symptoms of cinchonism, both for its antiperiodic effect and as a general tonic. A weak faradic current of electricity applied to the affected parts is frequently followed by great relief from the unpleasant symptoms, lasting for several hours after the application; the frontal headache especially can be controlled by it. One of the poles should be pressed against the forehead over the frontal sinuses, while the other, terminating in a probe-like and insulated end carrying on its extremity a small piece of sponge moistened with salt water, should be introduced into the nostrils as high up as possible.

By this mode of treatment the affection can frequently be cut short, not to return during the same season. If the snuff and the nasal douche be used some time before the attack comes on, it can even be prevented altogether, or at least it will be mild and of short duration.

Cold applications to the forehead and back of the neck will in many cases control the paroxysms of asthma, which are probably due to reflex action on some of the branches of the pneumogastric nerve.

The irritation due to acute ordinary coryza if frequently repeated at short intervals will give rise to a subacute inflammation, which, if the exciting causes be present, will turn into a chronic catarrhal inflammation of the posterior and anterior nares.

#### POST-NASAL CATARRH.

This chronic inflammation is designated by the collective term of post-nasal catarrh, and is one of the most frequent affections in this country, so much so that it

has been estimated that out of one million inhabitants of the United States nine hundred and ninety thousand suffer therefrom, and this average is even greater in some localities.

*Symptoms.*—The symptoms are a dryness of the mucous membrane of the nose, as well as of the posterior wall of the pharynx and of the nostrils, which adhere to the septum of the nose when pressed against it. This dryness disappears on exposure to cold air, and in its stead a watery discharge is noticed, causing the patient to “sniffle.” The nose feels hot and more or less obstructed, especially at night and when in a recumbent position, which causes the patient to sleep with his mouth open. This produces a dryness of the mouth and throat, necessitating a frequent moistening with water, and thus breaking sleep. In the morning frequent sneezing is often observed, and the patient has to hawk in order to rid his throat and nose of the large amount of tenacious mucus. The swelling of the mucous membrane produces a feeling of fulness, and the patient is tempted to frequently blow his nose, but without succeeding in removing the obstruction. A dull frontal headache is almost always present, and in many cases of long standing a fetid discharge together with offensive breath is noticed.

A rhinoscopic examination shows the mucous membrane of the post-nasal cavity to be reddened and swollen, with here and there patches of greater intensity of color, while scabs of dried and hardened mucus are found to adhere to it in many places. Frequently, also, ulcerations of a catarrhal character are noticed, especially in Rosenmuller's groove on either side.

A microscopic examination of the epithelial cells, scraped from the mucous membrane of the posterior nares, reveals the fact that most of them are devoid of cilia, which are found on all cells covering the healthy mucous membrane. This helps to account for the dryness of the anterior nares, and the dropping of the tough mucus into the larynx, because the cilia do not move the secretions towards the outlet. The formation of ulcers must be explained by the fact that mucus collects in the depressions of the wall of the nasal cavities, where, putrefying and softening the epithelial covering, it exposes the spot to the influences of air and the acrid secretions. Frequently the inflammation extends along the Eustachian tube into the middle ear, and then causes the symptoms of catarrh of the middle ear.

*Causes.*—The causes of post-nasal catarrh are very numerous, and are all more or less intimately connected with the pleasures and vices of social life. As has been said, a frequent repetition at short intervals of an acute coryza, which sequence often happens in our changeable climate, predisposes the mucous membrane to chronic inflammation, especially when other causes are added to this one. Thus the breathing of impure air in ill-ventilated rooms, and especially at night and during sleep, is one of the most frequent causes of catarrhal inflammation of the mucous membrane. So also is inhalation of air filled with dust, and particularly dust composed of filaments of cotton or wool, such as is to be found in cotton mills and in rooms the floors of which are covered with carpets. This is probably the reason why this disease is so much more prevalent in America and England than



on the continent of Europe, where carpets are only to be found in the houses of the wealthy. Alcoholism, masturbation, venereal excesses, and anything that tends to reduce the vital energy of the system must be looked upon as causes of post-nasal catarrh.

*Treatment.*—In the treatment of this affection our attention must, therefore, be directed to the cleansing of the mucous membrane and the removal of collections of mucus, to the prevention of putrefaction of such collections, and the stimulation of the mucous membrane to healthy secretion, and the reproduction of ciliated epithelium, and, finally, to the prevention of all irritations which tend to keep up the tumefaction. The cleansing and disinfecting of the nasal cavity can best be done by the nasal douche, used twice daily by the patient. To the salt and water may be added 2–5 drops of the dilute carbolic acid. This is sufficient for disinfecting purposes, without leaving any odor of the acid behind. Permanganate of potash may also be used for the same purpose, in doses of 5–10 grs. to the pint of salt and water, but it has the disadvantage that it discolors the nostrils, and is therefore objected to by patients. A solution of salicylic acid, as well as chlorine water, may also be employed as a deodorizer. In order to stimulate the mucous membrane to healthy secretion various astringents and stimulants may be employed with the nasal douche, such as sulphate of zinc and copper, tannic acid, in the strength of 10 grains to the pint of water, and salt. A few drops of the resin oil or the fluid extract of cubebs or of the compound tincture of benzoin may be added to the liquid with beneficial results. Nitrate of silver solution, of about 5



grs. to the ounce, is generally employed to stimulate the mucous membrane, and is used in the post-nasal syringe. It can, however, also be employed in the nasal douche when the proper density of the liquid is produced by the addition to the water of sugar of milk.

Abrasions or ulcers should, if possible, be touched with strong solutions of nitrate of silver, such as are used in treating ulcers in the larynx. The brush is to be introduced through the mouth, and guided by the rhinoscopic mirror, if the sores are situated in the posterior nares; if they are in the anterior cavities they can be easily reached from the external openings. The internal use of alteratives and bromides to change the character of the secretions, as also of tonics if called for by the condition of the system, should not be neglected. The swelling of the mucous membrane lining the frontal sinuses, which causes the frontal headache, is very difficult to reduce, and it is usually the last symptom to disappear, inasmuch as no direct application can be made to this mucous membrane. Counter-irritation, and leeches applied to the temples, frequently afford great relief, but they have often to be repeated, and are objected to, especially by ladies, on account of the disfigurement by scars. Electricity may be used with very great advantage for the removal of this symptom of catarrh. Frequently, even after one application of the poles of the battery to the forehead, the frontal headache is diminished. The best effect is produced if one of the poles is applied to the forehead by means of a plate of metal covered with moistened chamois skin, while the other pole, terminating in a sponge-covered probe-like end, is introduced into one and then the other nostril.

The cases, however, in which the relaxation has lasted for some time, and is not due to dropsical effusion, refuse to yield to the astringent treatment, and amputation of the uvula is the only proper mode of treatment. This may be done by means of a pair of scissors and forceps in cases where the patient is willing and determined to have the operation performed. The forceps should grasp the end of the uvula so as to prevent its slipping back, and to prevent also its falling into the larynx after it has been cut off by the scissors as near to the root as possible. The pain and hemorrhage in this operation are very slight indeed, not infrequently altogether absent. The wound usually heals by first intention within two or three days, the patient in the mean while being fed on soft food.

In children it often becomes a matter of some difficulty to introduce two instruments into the mouth in order to clip the uvula, and in such cases it is better to use an instrument called a uvulatome, which combines both the forceps and the scissors in one instrument.

*Uvulotomes.*—Various forms of instruments combining the forceps with the cutting instrument have been introduced, but they all have such disadvantages that most operators prefer to use the forceps and scissors separately, even if they have to struggle with the patient, and can perform the operation but unsatisfactorily.

Having frequent occasion in dispensary work to perform the operation, I endeavored to construct an instrument which would obviate the difficulties attending the use of such instruments as Elsberg's guillotine uvulatome and the ordinary Mutter uvula

scissors. I had, therefore, an instrument made which consists of a pair of strong scissors, the handles of which are bent so that the hand holding them is below the mouth of the patient when the uvula is grasped. The right blade is bent at right angles, forming a hook at its end, while the left blade is pointed, and reaches to the upper margin of the bend of the right blade. Thus when the blades are separated, a triangular opening is formed into which the uvula can drop and be cut near its root, the hook-like bend of the scissors preventing its slipping backward out of the grasp of the instrument. Upon the same pivot upon which the blades of the scissors revolve are attached a pair of pronged claws lying on the under surface of the scissors blades; they serve to catch the amputated piece (Fig. 28). With this instrument no difficulty will be experienced in grasping and cutting the uvula even if the patient should struggle, since the handles of the scissors are held so that the pressure of the fingers in closing them keeps the blades

Fig. 28.



Seller's uvula scissors.

in close contact with each other. This is not the case with Mutter's uvula scissors, which instrument, not having a sufficient bend in the handles, either brings the hand holding it on a level with the mouth of the patient, thus obstructing the view, or else it must be held from below, in which case the pressure upon the handles is reversed, and the blades slightly separated, so that the scissors do not cut well, and frequently a shred of mucous membrane is wedged between them which must be torn off in order to free the instrument. The same difficulty, but to a much greater degree, exists when Elsberg's guillotine uvulatome is used. The two blades of the latter are very easily separated, and often the soft flabby tissue of the uvula becomes wedged and bruised between them, instead of being cut through, thus necessitating a removal of the instrument, and a repetition of the operation with the forceps and scissors, if no other instrument is at hand.

#### HYPERTROPHY OF TONSILS.

An acute inflammation of the tonsils, exhibiting the different symptoms of inflammation elsewhere, is of frequent occurrence. It may be either simple or complicated with an acute pharyngitis and laryngitis, under which head it has already been described; it remains therefore only to describe the symptoms and treatment of chronic tonsillitis or hypertrophy of the tonsils.

*Symptoms.*—The symptoms of such a condition are more passive than active, that is to say, there is usually no pain or active inflammation. There exists,



however, more or less obstruction to the passage of the air in breathing, which causes the patient to snore when asleep. The articulation is what is called "thick," and more or less difficulty of deglutition is observed. The degree of obstruction to breathing being dependent upon the amount of swelling of the glands, the latter may lead to alarming symptoms of dyspnœa, especially in children, when an acute coryza obstructs the nasal passages. Usually these hypertrophied glands are the seat of periodical acute inflammations, causing a great deal of suffering to the patient.

*Treatment.*—In treating hypertrophied tonsils we may with propriety look upon them as tumors or neoplasms, inasmuch as a microscopic examination reveals the fact that they consist of a large amount of newly formed fibrous tissue separating the glandular elements, and giving the organs their peculiar hardness and firmness. Like enlarged glands elsewhere, they may be reduced by the application of astringents, which must be, however, of a very active sort, such as strong solutions of nitrate of silver or of the solid lunar caustic; iron and tannic acid have but little effect even when the applications are frequently repeated and continued for a long time. Application of the tincture and solution of iodine to hypertrophied tonsils has been recommended, but is apt to cause unpleasant results by producing spasm of the glottis by reflex action. Injection of solutions of iodine into the substance of the gland by means of a hypodermic syringe, however, is often followed by a speedy reduction of the tonsil without causing the unpleasant

results that are apt to follow the application of the drug to the mucous membrane.

The best and most satisfactory mode of treating hypertrophied tonsils is to cut them off as close to the pillars of the fauces as possible, or to enucleate them altogether. This may be done in adults by means of a pair of forceps and a bistoury, the operation being, however, rather tedious and bloody, but, strange to say, not at all painful. A better, quicker, and more safe mode of operating is by means of an instrument called the "tonsillotome." As in the treatment of elongated uvula in children, the quickest and simplest mode of removing the offending part is the only applicable method. There are two kinds of tonsillotomes in use, the older form invented by Fahnestock, and a later improved form.

Fahnestock's tonsillotome (Fig. 29) consists mainly of an annular knife, which moves in a split ring, through which the enlarged tonsil is pushed, and of a stout needle attached to the instrument in such a way that it can be pushed forwards, thus transfixing the gland and preventing its slipping out of the ring. When thus secured, by pulling out the handle of the tonsillotome the protruded parts are cut off with the annular knife. It will be seen that in order to use this instrument both hands are needed, and two motions must be executed, viz., the pushing back of the needle and the pulling forward of the knife.

Another instrument, requiring but one hand and one motion in its use, is figured in Fig. 30. It consists of a chisel-like knife sliding in grooves over an oval opening, through which the tonsil is pressed. Above the opening and the knife blade are two claws, which



grasp the gland and pull it through the opening as the knife is pushed through, thus causing the cut to

Fig. 29.



Fahnestock's tonsillotome.

Fig. 30.



Billings' tonsillotome.

be made in a slanting direction, from before backwards, following the natural outline of the buccal cavity at that place.

After the operation, which is not at all painful provided the tonsils are not in a state of active inflammation, the bleeding is to be stopped by the patient rinsing his mouth with cold water. Occasionally it happens that the hemorrhage following the operation is somewhat profuse, and the cold water alone is not sufficient to stop it. In such cases, which are very rare, the cut surface may be painted with tincture of iron or nitrate of silver, which will control the bleeding. In fact, I am in the habit of always painting the cut surface with nitrate of silver solution, since it seems to start the process of repair at once, and at the same time protects the wound from the influence of the air. The wound usually heals within a few days by granulation, so that after the lapse of a week from the operation the parts present a normal appearance. During this time the diet of the patient should be of the mildest kind; spices and alcoholic stimulants should be avoided, and if the patient complains of great soreness, flaxseed poultices should be applied to the sides of the throat. Usually, however, no complaint is made of any soreness except during the act of swallowing, and even that is greatly diminished by taking liquid food through a tube.

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## CHAPTER XII.

### FUNCTIONAL DISORDERS OF THE LARYNX.

HAVING described the symptoms and the treatment of inflammations of the mucous membrane lining the larynx, pharynx, and nasal cavities, we can now pro-

ceed to consider the functional disorders of the larynx either as the result of inflammatory processes or those independent of such causes.

## APHONIA.

The most common of these functional affections is aphonia or loss of voice. It is due in the first place to an inability of the vocal cords to vibrate with sufficient rapidity to produce sonorous vibrations of the air, or to an inability of the vocal cords to vibrate in harmony with each other, thus producing an irregular motion of the air. In the first instance total loss of voice will be the result, in the latter hoarseness of the voice to a greater or less degree will be observed.

*Causes.*—This inability of the vocal cords to vibrate may be due to several causes:—

1. To thickening or swelling of the cords in acute and chronic inflammations, and in œdema of the glottis, making them so heavy and inelastic that the current of air from the lungs cannot move them.
2. To the destruction of part or the whole of one or both vocal cords by corrosive agents accidentally introduced, or by extensive ulceration the result of syphilis or cancer.
3. To cicatrization of the cords following the operation for the removal of neoplasms, or the unsuccessful attempt at cutting the throat, or following the healing of linear ulcers, thus gluing the cords together.
4. To paralysis of the muscles of vocalization, either on one side only or on both sides, thus preventing the narrowing of the glottis to a slit, or causing a relaxation of the cords when approximated, so that the

vibrations are too slow to be appreciated by the ear as a continuous sound.

5. To the presence of a neoplasm or foreign body which mechanically interferes with the sonorous vibrations of the cords.

Hoarseness or partial aphonia, being due to the same causes, exerting their influence in a less degree, may be considered together with total loss of voice.

The aphonia which is caused by swelling of the cords due to inflammatory infiltration, hyperplasia, and œdema, the cords becoming so thick and heavy that they cannot vibrate with sufficient rapidity to produce an audible sound, together with its treatment and duration, has already been considered under the head of acute and chronic laryngitis. In the same way has destruction of one or both cords been mentioned under the head of syphilitic laryngitis.

The third cause of aphonia, the cicatrization following operations, wounds, or ulcers, and gluing the edges of the cords together, has not been mentioned as yet. Although rarely met with, it is of sufficient importance to deserve a detailed description.

#### APHONIA DUE TO CICATRICIAL ADHESION.

In cases of linear ulcers lying along the free edge of the vocal cords, especially toward the anterior part, cicatricial tissue is formed by the healing of the sores, which is very apt to connect the edges of the cords at their insertion into the thyroid cartilage. This cicatrization, moving from before backward with the healing of the ulcers, produces a gluing together of the cords in the same direction. By the contraction

of the newly formed tissue the edges are drawn together until the end of the ulcer is reached, thus virtually shortening the vocal cords and glottis until only a small triangular hole is left, through which the air rushes inward and outward with a whizzing and often whistling noise.

Vocalization being painful and the voice usually hoarse in cases of long linear ulcers of the cords, the patient desists from the use of the voice, and is advised to do so by the medical practitioner who has not made a laryngoscopic examination. But this want of movement of the vocal cords favors the formation of the cicatricial tissue, and when once a connection between the edges of the cords is established it rapidly travels backward, making vibration impossible, and causing dyspnoea by closing the glottis.

The same union of the cords takes place after an unsuccessful suicidal attempt to cut the throat, in which an incision in a transverse direction is made in the angle of the thyroid cartilage at a point where the vocal cords are inserted, and cuts them longitudinally or more frequently obliquely. The large vessels of the neck not having been severed, the wound heals rapidly, and in doing so connects the edges of the cut cords by cicatricial tissue.

It is curious to note what a small opening of the glottis will admit sufficient air for the wants of the system, provided it grows smaller gradually. The quantity of air taken in through such a greatly contracted glottis would be altogether insufficient and death by asphyxia would result if the glottis were reduced to such a size suddenly.

*Treatment.*—The treatment in such cases consists in

cutting through the cicatricial tissue connecting the edges of the cords with the laryngeal lancet. After the division the edges should be cauterized with solid nitrate of silver, and the patient required to use his voice by talking or reading aloud, even though the voice should be hoarse and vocalization painful, in order to prevent a reformation of cicatricial tissue and a reunion of the free edges of the cords.

In making the section of the cicatrix the epiglottis must be held back by the forceps described above, so as to obtain a good view of the anterior angle of the glottis.

If the opening of the glottis is so small that the system suffers from want of oxygen, and the throat of the patient is irritable and must be educated to bear the introduction of the instruments, so that immediate relief of the dyspnœa cannot be obtained by division of the cicatrix, tracheotomy or, better, laryngotomy should be resorted to without hesitation or delay. If the latter operation is decided upon, it is often possible to separate the cords by section from below, introducing the knife through the external wound, and cauterizing the cut edges in the same way, so that the laryngotomy wound can be closed immediately, when the introduction of a tube becomes unnecessary. This of course to a very great extent increases the chances of a speedy recovery from the operation. If however the division cannot be made from below, the tracheotomy tube must be introduced and the wound allowed to heal around it before any attempts at laryngoscopic examination or operative interference from above should be made.

After the division has been made and the edges of the cords have healed, the voice frequently remains



hoarse on account of the increased weight and thickness of the vocal cords by reason of inflammatory infiltration and hyperplasia. In this case a plan of treatment must be adopted with a view to remove this obstacle to clear phonation.

#### APHONIA DUE TO PARALYSIS.

The most common cause of aphonia is paralysis of some of the muscles moving the vocal cords and employed in vocalization. Several degrees of paralysis of the cords are observed, such as unilateral paralysis or bilateral paralysis of the cords, paralysis of the abductors, or paralysis of the tensors and adductor muscles, or finally hysterical aphonia, in which at one time one set of muscles is affected, while at another time another set will refuse to act. All of these are classed under the common head of aphonia due to paralysis.

*Symptoms.*—If both vocal cords are affected no sound whatever will be heard when the patient attempts to speak except the accidental friction sound produced by the exhaled air striking against the projections in the cavities above the larynx. Laryngoscopic examination informs us that the vocal cords are relaxed and widely separated from each other, forming the glottis as we see it in quiet breathing. In many cases the cords are seen to make an attempt to approach each other when the patient essays phonation, but instantly fall back into their original position. This is caused by the sphincter glottidis refusing to act while the crico-thyroid muscle momentarily stretches the cords.

In some cases of bilateral paralysis of the cords a faint fluttering noise is perceptible when the patient makes an effort to speak. The laryngoscopic mirror shows this to be due to an attempt at closing the glottis by the sphincter while the cords remain relaxed, not being stretched by the crico-thyroid muscle. In still other cases we notice a momentary stretching of the cords and a closing of the glottis, which however can not be kept up by the affected muscles, and consequently no sound is produced.

#### UNILATERAL PARALYSIS.

If the muscles of one side only are affected, the cord on the other side is seen to move toward the median line, and is made tense, while the cord on the

affected side remains relaxed, and applied to the wall of the larynx.

(Fig. 31.) Here, again, as in bilateral paralysis we may have an action of the thyro-arytenoid, together with the arytenoid muscles, in moving the cords together, while the crico-thyroid on the affected side fails to stretch the cord; thus a peculiar hoarseness of the voice is produced, and the rima glottidis presents an opening of the shape

Fig. 31.



Paralysis of left vocal cord (Cohen).

of an Indian bow, the convexity of the curve being toward the affected side.

If on the other hand the paralysis is only partial in both the sphincter and tensor muscles, the cord on the affected side moves toward its fellow sufficiently to be set in vibration; being, however, not stretched

to the same extent as the healthy cord, it vibrates less rapidly. This produces an irregularity of the air motion which we perceive as noise or hoarseness of the voice. It frequently happens that the patient is hoarse in one part of his voice only, generally in the higher notes and not in the lower registers. This is due, if no inflammation or thickening of the cord exists, to the fact that the affected muscles may be strong enough to stretch the cords and keep them approximated as long as this does not require much force, as in the lower registers, but that they are unable to perform their function when greater force is required. Thus it will be seen that upon the degree of the affection of the muscles depends the degree of aphonia due to paralysis.

*Causes.*—The causes of this affection of the vocal muscles are very diverse, and the prognosis in every particular case should be very guarded until their true nature is fully established. Paralysis of the cords may be caused by disease of the nerve centres, or of the branches supplying the nerve force to the muscles of the larynx; or it may be due to pressure upon the recurrent laryngeal branch of the pneumogastric nerve by tumors in the neck, such as goitre, sarcomatous infiltration of the thyroid gland, aneurism of the larger vessels, etc. It may also be due to inflammatory action and infiltration interfering with the exercise of the function of the muscles, and if of long standing this may cause atrophy of these muscles; or it may be one of the symptoms of hysteria, which is perhaps the most frequent cause of aphonia in women; or finally it may be due to over-exertion and sudden failing or giving out of the contractile forces of the muscle.

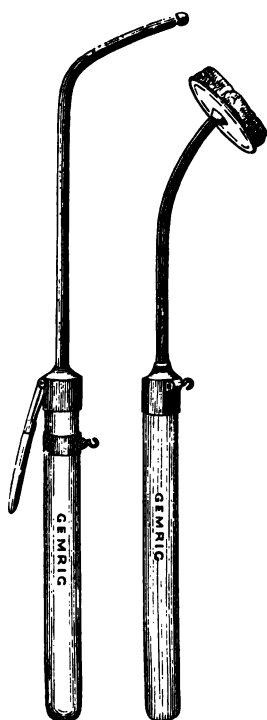
*Treatment.*—In all cases of loss of voice a careful examination of the larynx and the neck should be made in order to determine if possible the remote cause of the trouble, as upon the nature of this cause depends the tenor of the prognosis.

If disease of the nerve centres can be diagnosed by the presence of symptoms other than mere aphonia, the prognosis of course is very unfavorable, and the

treatment should be directed to this systemic affection. If it is found that pressure upon the laryngeal nerve is the cause of the aphonia, this pressure if possible should be removed by operation. If inflammatory action is the cause, the treatment for chronic inflammations should at first be resorted to, and then the specific for local paralysis of the cords, viz. electricity, should be used, as it should be also in cases depending upon hysteria, or caused by over-exertion of the voice. In the latter case, however, a strong solution of nitrate of silver applied to the cords often has a very beneficial effect by its stimulating action.

Electricity applied externally acts as a local tonic, and frequently is very beneficial

Fig. 32.



Mackenzie's laryngeal electrode.

in allaying an acute irritation, such as is produced by the applications to the larynx of astringents in the form of powder, without interfering with their intended action. But in aphonia dependent upon paralysis this mode of applying electricity avails nothing, no matter how long its use may be continued. To be of benefit the current should in such cases go directly through the affected muscles. This may be accomplished by Mackenzie's laryngeal electrode (Fig. 32).

This instrument is composed of a handle of glass, wood, or hard rubber, into which is screwed an insulated copper wire curved at the end and terminating in a small platinum ball. In order to prevent the current from passing through the electrode while being introduced, the handle is furnished with an interrupter, a lever supported by a spring which is in metallic connection by a hinge with the wire at one end. The other end is furnished with a handle of some non-conducting substance, such as glass, bone, or rubber, for the purpose of affording a hold for the forefinger to depress the lever and keep it in contact with a metallic ring surrounding the handles, to which one of the connecting wires from the battery is attached. As long as the lever is kept down upon the ring, the current is passing, but is interrupted as soon as it is lifted by the supporting spring when the pressure is taken off. The other pole of the battery is attached to an ordinary electrode, and is given to the patient to press against the neck on one side or the other of the larynx. But as this is inconvenient, and the patient in the act of gagging frequently breaks the current by removing the pole from the skin, it has been found more convenient to connect this pole with a metal plate,



which is covered with sponge, and which rests in contact with the skin upon the outside of the larynx, and is secured in that position by a band attached to the ends of the plate, and passing around the neck of the patient. In applying the electricity to the affected muscles, the plate is placed over the larynx, the sponge having first been moistened with salt and water. Next the laryngeal mirror is introduced until a good view of the larynx is obtained. Then the electrode is quickly passed down until the platinum ball lies in the inter-arytenoid space. While introducing the electrode the finger must be kept off the lever, and contact must not be made until the parts to be faradized are reached. In some cases, as for instance, when paralysis of the arytenoid muscle alone can be diagnosed, both poles are introduced into the larynx. The instrument made for this purpose is very similar to the one just described. It has two covered wires instead of one, which run parallel with each other to within a short distance of their bulbed ends, when they separate so as to take the parts to be excited between them. The wires being flexible the distance between the bulbs or balls can be increased or diminished as the case may require. Contact is made by the lever when the electrode is in position. Many patients can endure a comparatively strong current for a considerable length of time, but the instrument should invariably be withdrawn as soon as gagging sets in, for the bulb of the electrode is easily displaced by the convulsive movements of the larynx.

Internally tonics, and especially strychnia, should be given, for almost always the general health is impaired, partly by the cause of the paralysis itself,



and partly by the mental anxiety caused by the loss of voice. Exercise in the fresh air, and pleasant mental diversion should be strongly advised. In hysterical aphonia the salts of bromine should be administered.

The duration of the disease is very uncertain. It varies with the cause and the length of time the loss of voice has existed before treatment has commenced. There are cases in which the aphonia, due to loss of contractility of the muscles, comes on suddenly, and is often removed by *one* application of the poles of the battery. In most cases not due to disease of the nerve centres or to pressure upon the laryngeal nerve, the voice returns gradually and slowly, and many applications are necessary to restore it. This is especially the case with aphonia due to hysteria, which often requires many months of patient treatment before any improvement is noticed. But on the other hand the voice in these cases often suddenly reappears, sometimes permanently, sometimes for a short time only. Females are more frequently affected in this way, but we find hysterical aphonia also in males.

#### APHONIA DUE TO THE PRESENCE OF FOREIGN BODIES.

If the aphonia is due to the presence of a foreign body, accidentally introduced, it should be removed at once. Usually such foreign bodies are pins and fish bones, which with their sharp points penetrate the mucous membrane, and are thus held in position, while other substances such as buttons, seeds of various kinds, and small pebbles, if inhaled into the

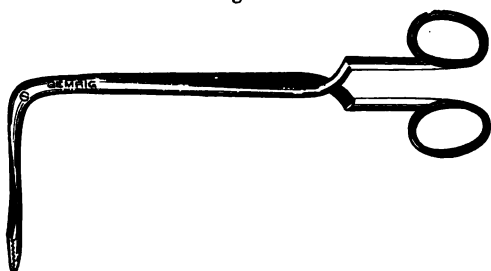
larynx, are either expelled by a fit of violent coughing, or fall down into the trachea or bronchi from whence they cannot be extracted. Of foreign bodies causing aphonia, pins are most frequently found, especially in women. The almost universal habit of putting pins in their mouths frequently leads to the sudden inhaling of one of them when the woman is startled. Fish bones, usually of small size, as well as small splinters of bone, may enter the larynx while eating. An inspiration taken during the act of swallowing may cause a part of the food to enter the larynx, and a fit of coughing follows in order to expel the foreign body. This is commonly called "*food going the wrong way.*" If a bone thus enters the larynx it is apt to become imbedded in the soft tissues of this organ, when actual contact with the cords or the irritation and swelling of them cause aphonia. The same occurs when a pin has been inhaled. Occasionally we find bristles from a tooth-brush, pieces of straw, which some persons are in the habit of chewing, pieces of toothpicks, bristles from the ears of wheat, egg- and oyster-shell splinters, etc., as foreign bodies. All these are, however, more commonly arrested before entering the larynx proper, and are most frequently found in the glosso-epiglottic folds or grooves, where by their piercing the mucous membrane they create an irritation which lasts for some time after the removal of the foreign body. It is, therefore, very common for persons to apply to a physician for the removal of a fish bone, oyster-shell splinter, or piece of egg shell, which on examination does not exist, but which undoubtedly had been there long enough to cause an irritation, and had either

been removed, unnoticed by the patient, by coughing or in the act of swallowing. Under such circumstances it is often difficult to convince the patient that there is nothing in his throat but the irritation left by the foreign body, which will subside in a very few days, and the practitioner is sorely tempted to practice a little fraud in order to obtain the patient's good opinion of his skill.

For the removal of foreign bodies from the larynx or fauces, as well as for the extraction of tumors in these cavities and in the nasal cavity, numerous instruments have been invented, some of which I will describe here before entering on the subject of neoplasms and their removal. The great desideratum in such an instrument is that it should be a pair of forceps curved at the end, that it should be strong enough to enable the operator to make traction without its slipping, and that its body should occupy as little room as possible. When the foreign body is lodged in the fauces or glosso-epiglottic grooves, and is not too tightly imbedded, the already described sponge-holder or epiglottis forceps answers admirably, but when the body is lower down or is tightly imbedded, an instrument of different construction must be employed. The most useful kind of forceps is Mackenzie's common laryngeal forceps, almost exclusively used by him for the removal of neoplasms and foreign bodies from the larynx (Fig. 33). It is made of steel, with stout scissors-like handles, is of considerable length, and bent at right angles, terminating in spoon-shaped extremities, which open either laterally or antero-posteriorly. In the former, the pivot upon which the blades move is at a point

between the handles and the bent extremities, while in the latter it is at the bend. It is necessary to have these two forms of instruments, since foreign bodies

Fig. 33.



Mackenzie's laryngeal forceps.

and tumors are frequently found in such positions that they can be grasped only with one or the other form of forceps.

The spoon-shaped blades of the forceps are hollowed out, so that the opposing edges are sharp, and can be used for cutting off pieces of neoplasms grasped between them. In another form, which is designed expressly for the removal of foreign bodies, the blades are solid, and the opposing surfaces ribbed, so as to prevent slipping. In still another form, only one of the blades is hollow, with cutting edges, while the other presents to it a smooth surface.

The introduction of these forceps is somewhat difficult on account of the sharp bend, and the length of the extremities, but it has been found that this form is more useful in a greater number of cases than the curve employed in other instruments designed for the same purpose.

The French and German laryngoscopists use what are called "*tube forceps*," and among them that designed by Prof. Stoerk, of Vienna, is perhaps the most useful of all (Fig. 34). It consists of a universal

Fig. 34.



Stoerk's guillotine and tube forceps.

handle, into which a number of different forceps, slings, and cutting instruments can be inserted. The forceps used in this handle is made of a tube of metal, so curved at its extremity that its end can reach the vocal cords without difficulty. Within this tube is a thin flexible steel wire, to the end of which two blades are attached, projecting beyond the end of the tube, and having ribbed surfaces. Their blades are separated by a spring, concealed within the tube, and are approximated by retracting them within the tube. This retraction is effected by means of a slide attached to the universal handle; to this slide the end of the wire carrying the forceps blades is fastened, while the tube is inserted into the handle itself. Sometimes it happens that a tumor or foreign body is in such a position that neither a laterally nor antero-posteriorly opening forceps can be employed. For such cases a wire loop, extending from the extremity of another tube secured in the universal handle, will be found very useful. The loop can be thrown around

the tumor or foreign body, and then, by making traction upon the ends of the wire secured to the slide

of the handle, it can be grasped and removed.

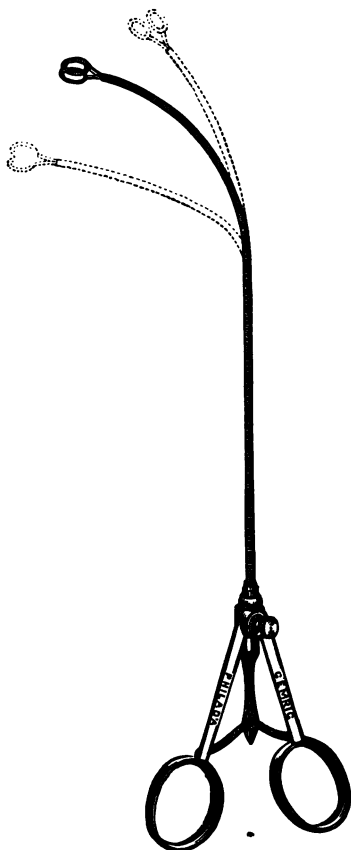
Quite recently a universal tube forceps for the removal of foreign bodies from the larynx has been brought to this country from Paris, and a similar instrument has been manufactured by Messrs.

Gemrig and Sons, of Philadelphia (Fig. 35). It consists of a spiral of steel wire, which is attached to a pair of scissors handles, connected by rotating levers. At the junction of these levers a copper wire is fastened, which runs through the spiral, and ends, like Stoerk's tube forceps, in two blades, which protrude beyond the end of the spiral.

On separating the handles the wire is

pushed forward, and the blades open. On closing the handles traction is made upon the wire, and the

Fig. 35.



Universal tube forceps.



blades are drawn into the spiral, thus approximating them. The advantages of this instrument over others consist in the facts that it can be bent to any desired degree, and that on account of the spiral tube the blades of the forceps can be made to open in any desired direction. The instrument was designed for the removal of foreign bodies from the laryngeal cavity, and answers this purpose admirably. It cannot be used, however, for the extraction of tumors, because it is not strong enough.

Several other forms of open or tube forceps are in use which are similar in principle to those described, and differ from them only in minor details. As a matter of course the same size of forceps will not answer for all cases, and different shapes and sizes should therefore be kept ready for use.

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## CHAPTER XIII.

### NEOPLASMS OF THE LARYNGEAL AND NASAL CAVITIES.

#### USE OF INSTRUMENTS.

BESIDES the forceps described in the foregoing chapter, cutting instruments are frequently used in operating for tumors in the laryngeal and nasal cavities.

Formerly when laryngoscopy was in its infancy, and laryngeal surgery was only beginning to be made use of, so-called open laryngeal knives were used, especially by von Bruns, of Tübingen, who claims to have been the first to remove a tumor, or at least

perform a surgical operation in the laryngeal cavity. Such an open knife consists simply of a curved steel wire, secured in a handle, and terminating in a knife blade, either sharp- or blunt-pointed. This knife blade, which is very narrow, must have its cutting edge either laterally or antero-posteriorly, so that incisions may be made either transversely or longitudinally to the axis of the glottis. In order to be able to cut both forward and backward and from side to side, the blade is made with a cutting edge on either side like a dagger. The introduction of such an open knife into the larynx is, of course, rather hazardous, inasmuch as the epiglottis or the posterior wall of the pharynx or the tongue would be easily wounded if the patient should gag and the knife have to be removed quickly. The laryngeal knives now in use are therefore covered, that is, the blade is contained in a curved tube, like the one used for the tube forceps, from which it can be protruded by means of a lever upon the handle, which either retracts the tube from over the knife blade or pushes the latter out of the tube when the instrument is in position and the incision is to be made. As soon as gagging sets in, the pressure upon the lever is taken off, and the knife instantly is concealed within the tube, so that no harm can be done to any of the parts in removing the instrument.

Mackenzie's forceps must be regarded as cutting instruments, inasmuch as the blades have cutting edges and act like nippers.

Stoerk has attached to his universal handle (see Fig. 34) a very ingenious cutting instrument called a guillotine, which is the safest and most useful of all

instruments of this class. It may be looked upon as a combination of the wire loop and the covered knife, since it consists of a permanent loop with an inner cutting edge, or, in other words, an annular knife. This, like the tube-forceps and the covered knife, may be retracted into an expanded and flattened extremity of a curved tube, and by this motion will cut off as much of a tumor as can be pressed through the opening of the knife blade. In order to shave close to the surface of the mucous membrane or the edge of the vocal cords, the blade is ground flat on one side and hollow on the other. This of course necessitates the employment of a right and a left blade, and an anterior and a posterior blade. The former and the latter pair can each be inserted into the same tube; thus it is necessary to have four blades and two tubes.

With this instrument, when once introduced into the larynx, a tumor, projecting for instance into the glottis and attached to the edge of one of the cords, can be surrounded and cut off by the knife even when the patient gags and struggles, inasmuch as no part of the larynx can be injured by the knife. There are, however, cases in which none of the instruments existing is applicable, and the ingenuity of the operator is called upon to devise modifications so as to adapt the instrument to the requirements of the particular case, or, if this cannot be done, to invent a new instrument altogether.

Besides the forceps and knives for the removal of tumors and foreign bodies from the larynx, an exploring instrument should be used in order to ascertain the consistency of a tumor, its attachment to the mucous membrane, whether by a slender stem or by

a broad base, etc., and for various other purposes. Such an instrument is called a laryngeal sound or probe. It has already been described as consisting of a piece of silver wire bent to the proper curve and held in a mirror handle. In most cases it serves its purpose of exploring very well, but in some instances where it is necessary that a tumor should be lifted up in order to ascertain its location and mode of attachment, the end of the probe must be bent into the shape of a hook.

### NEOPLASMS.

*Symptoms.*—Besides the aphonia, which in neoplasms is of a peculiar character, inasmuch as the voice, which is usually hoarse or sometimes quite natural, is lost suddenly and completely for a few minutes, and then returns as suddenly, often with a change of position of the head or body of the patient, we frequently observe dyspnœa. Dysphagia, on the other hand, is rarely met with, and only occurs when the tumor is so large as to interfere with the movement of the epiglottis or when it springs from this organ. Pain is rarely observed, and usually attends only the malignant growths of the larynx. Cough, as a rule, is one of the symptoms of laryngeal tumors. Slight in most cases, but severe and harassing in a few, it is generally of a peculiar character, resembling the cough in croup, and is apt to come in paroxysms. The character, location, shape, and size of neoplasms in the larynx which may produce the foregoing symptoms is very varied. According to Mackenzie's statement they occur most

frequently upon the vocal cords, but may be found in almost any part of the larynx.

*Diagnosis.*—The diagnosis, as regards the presence of a tumor in the larynx, is very certain, if a careful laryngoscopic examination can be made, and the only sources of error are the eversion of the ventricle, an exceedingly rare occurrence, in which the mucous membrane lining the pouch protrudes like a tumor between the vocal cord and the ventricular band. The second source of error is an infiltration and consequent swelling of the ventricular bands, which in that condition may hide from view a small tumor situated in the vocal cord or on the lower surface of the ventricular band itself.

#### CLASSIFICATION OF TUMORS IN THE LARYNX.

Clinically the tumors met with in the larynx are divided into two great classes. In the one are those which, after thorough operative removal, do not usually return; in the other are those which will return, if not at their former seat, at some other part of the body, even after the most careful removal of all diseased tissue. The former have received the appellation of benign tumors, the latter that of malignant tumors. It is, however, exceedingly difficult at the present time to draw the line of distinction between these two classes; even when a microscopic examination has determined the nature of a growth, it is often impossible to say whether a tumor is benign or malignant, because neoplasms which formerly were regarded as perfectly harmless have been known either

to return after operation, or to change their character from a benign to a malignant form.

The tumor most frequently met with in the larynx is the *papilloma*, or wart-like growth, which springs from the mucous membrane lining the larynx. It assumes various forms, all more or less indented on their surface. This indentation has given rise to the variety of names which this kind of neoplasm bears, such as cauliflower, raspberry, mulberry, foliated, etc. These growths are usually attached by a broad base, and only occasionally do we find them pedunculated. Their rise varies from that of a mustard seed to that of an English walnut, but is usually that of a good sized pea. Their color is mostly pink, but sometimes white or bright red. A thin section of such a growth presents under the microscope the appearance of hypertrophied papillæ of the skin or mucous membrane.

The next in frequency of occurrence is the *fibroma*, a tumor usually pedunculated, pinkish or red in color, round and sometimes irregular or wavy in outline, with a smooth surface, hard and unyielding to the touch of the sound. Its rise varies from that of a small seed to that of an acorn, and is most frequently found to spring from the vocal cords.

Less frequent are the *fibro-cellular* tumors. They are usually found on the vocal cords, about the size of a pea, red or pinkish in color, sessile, with a smooth surface, and of a more or less globular shape.

Still more rarely met with are the *myxomata*, which in appearance resemble the fibromata, except that they are soft and yielding to the touch.



Only one case of *lipoma* or fatty tumor in the larynx has been reported (von Bruns.)

*Cystic tumors*, on the other hand, are more frequent, and resemble the fibrous tumors in shape, size, and color. They differ from them, however, in their mode of attachment, which is always broad. Their consistence depends upon the material with which they are filled, whether serous, caseous, purulent, etc. They also usually have a zone of irritation around them, and occur most frequently on the laryngeal surface of the epiglottis.

*Fasciculated sarcomata* and *adenomata*, or glandular tumors, show no distinctive features, but may resemble any of the above described neoplasms. They are very rarely met with in the larynx.

*Vascular growths*, or *angiomata*, also are very rare, and may be diagnosed by their dark almost black color, and granular surface, as well as by their tendency to bleed on being touched.

The so-called malignant growths found in the larynx are usually secondary deposits from a primary cancer elsewhere, and show the distinctive features of the primary growth. The most frequent of these is *epithelioma*; next in frequency are found, in the following order, *round-celled sarcoma*, *spindle-celled sarcoma*, *medullary carcinoma*, and *scirrhus*.

All of these are infiltrating and ulcerating, and give more the appearance of a localized tumefaction than of a new formation projecting into the laryngeal cavity.

*Treatment*.—Tumors in the laryngeal cavity, producing by their mechanical interference aphonia, dyspnoea, dysphagia, and other symptoms already de-

scribed, should, if possible, be removed by means of forceps or cutting instruments, and the seat of the neoplasm should be cauterized with solid nitrate of silver, to prevent a local return of the growth. In cases of secondary cancerous deposits in the larynx it becomes a difficult question as to whether surgical interference should be attempted or not. It is, however, always advisable in such cases to tear off a small piece for microscopic examination, so as to determine the precise nature of the growth. If, however, there is the hope of obtaining by operation even a slight temporary relief from the harassing symptoms, as much as possible of the growth and infiltrated tissue should be removed.

In the removal of a tumor from the larynx, its position, size, mode of attachment whether pedunculated or sessile, its vascularity, consistence, and other peculiarities, must be taken into consideration, in determining what mode of operation is to be adopted, and which of the many instruments is best adapted to the case.

Almost all patients suffering from neoplasms in the larynx require to be accustomed to the presence of an instrument in the laryngeal cavity by frequent introductions either of the instrument to be used in the operation or of the laryngeal sound, and it often requires weeks and months of daily practice before the removal of the tumor can be executed with safety.

In cases where dyspnoea exists to a considerable extent, on account of the tumor being so large as to interfere with the free ingress and egress of air, tracheotomy should be performed at once, as the patient is in imminent danger of suffocation. In most cases

of asphyxia, caused by laryngeal growths, it is not the tumor which suddenly closes the glottis and thus prevents breathing, but this closure is usually produced by spasms of the adductor muscles of the larynx approximating the cords, and its immediate cause is some slight irritation, such as the inhalation of dust, carbonic acid gas, ether, etc.

If the tumor is attached to the free edge of the vocal cord or ventricular band, either by a broad base or by a narrow stem, and if it is not too large, it can frequently be gotten through the fenestrated knife of the guillotine, and extracted in spite of the gagging and remonstrances of the patient. When the open or covered knife or even the forceps is to be used, the patient should be so trained that no amount of instrumental interference will produce gagging.

*Prognosis.*—The prognosis, as regards the local return of a tumor, depends altogether upon its nature, which can only be determined with accuracy by careful microscopic examination.

#### TUMORS IN THE NASAL CAVITIES.

Tumors are also found in the anterior and posterior nasal cavities, and the laryngoscopist is frequently called upon to remove them.

*Symptoms.*—The symptoms to which their presence gives rise when situated in the anterior nares are, a stoppage of either one or both nostrils, so that the patient is obliged to breathe through his mouth. This stoppage of the nose is usually aggravated in damp weather on account of the swelling of the neoplasms due to the hydrometric condition of the atmosphere.

Articulation is altered by the absence of those consonants whose articulation requires that a current of air should pass through the nose, and the patient speaks as if he had a cold in his head. Bleeding of the nose is a frequent symptom, and originates either from the tumor itself or from the congested mucous membrane in its neighborhood.

Tumors in the posterior nasal cavity gives rise to all the symptoms of post-nasal catarrh, and their presence is usually not suspected until a rhinoscopic examination is made.

These neoplasms, both in the anterior and posterior nares, are usually mucous or fibrous polypi, but other forms of tumors, such as have been enumerated as occurring in the larynx, are found.

Mucous polypi are of variable sizes, smooth, of pinkish-red color, and usually pear-shaped, and attached by a pedicle to the mucous membrane lining the nasal cavity. They seldom occur singly; usually from two to six are found in different localities. They are very soft and elastic, and have the peculiarity of absorbing moisture from the atmosphere, thus increasing their bulk.

The fibrous variety, on the other hand, is of a lighter color, hard and firm to the touch, and does not swell up in damp weather, but is pedunculated and pear-shaped, is not liable to bleed, and is usually single.

*Treatment.*—If the polypi are situated in the anterior nares, their removal is a very simple operation. After having dilated the nostrils with a dilator, or having an assistant holding them apart with his fin-

gers, a wire loop, such as is used for the larynx or for the extraction of tumors from the external auditory meatus, is thrown around the neoplasm, and slipped over it until the stem only is surrounded. The loop is then drawn in, and, constricting the peduncle of the polypus, finally cuts it off. Formerly a ligature was applied to the stem of these polypi, and allowed to remain until the tumor dropped off, which took place in from two to five days, the ends of the ligature hanging out of the patient's nose all this time, and frequently becoming very offensive.

These polypi, not being very sensitive, can be torn off by means of a pair of strong laryngeal forceps, or forceps especially designed for this purpose, which are slightly curved, with ribbed blades opening antero-posteriorly. If the tumors are small and of the mucous variety, they can be absorbed by long-continued applications of strong solutions of nitrate of silver.

If the tumors are found in the posterior nasal cavity, the operation becomes much more difficult, inasmuch as the motion of the instruments must be guided by the rhinoscopic mirror. The instruments used in such cases are usually the forceps and the wire sling, which must be introduced from behind the soft palate, which has been drawn forward and secured by a string between the patient's teeth, as has been described under the head of rhinoscopy. In most cases the ordinary laryngeal forceps or the tube forceps can be used; if the tumor is, however, so far in front as to be out of reach, a tube forceps of different curve must be employed. The operator in such cases works under very great disadvantages, as the body

of the instrument covers the blades in the image seen in the mirror, and consequently he cannot see with accuracy when the blades have grasped the polypus.

There are cases in which the tumor is in such a position that an instrument introduced from behind cannot reach it, and yet it cannot be seen in front. In such a case the loop or forceps must be introduced through the anterior nares while it is guided by the image of the blades or the loop, as seen in the mirror placed in the pharyngeal cavity.

Instead of using the cold wire loop in extracting tumors from the larynx or nasal cavities, the galvano-cautery may be employed. In this method the wire forming the loop is made of platinum, and when in position is heated to a white heat by the passage through it of a powerful current of electricity. By burning the neoplasm off in this manner hemorrhage is avoided, since the vessels are closed as soon as they are severed.

#### GALVANO-PUNCTURE.

Galvano-puncture also has been employed with great success in the removal of tumors from the larynx and nose, and especially those small fibrous growths which are imbedded in the substance of the cord and consequently cannot be cut or torn. In this mode of operation the powerful chemical action of electricity is made use of in order to break up the tissues of the tumor and prepare them for speedy absorption. The procedure is very simple, and consists in the introduction of a needle into the substance of the neoplasm, to which is attached one of the poles of



a battery, while the other pole is in contact with the skin in the neighborhood of the seat of the tumor. The battery need not be very strong, and for small tumors a single pint Bunsen cell is sufficient. The needle should be made of gold or silver, as steel is oxidized more readily by the electricity. From two to ten sittings are necessary to cause the absorption of a tumor of the size of a pea in the larynx, while nasal polypi, especially of the mucous type, are often absorbed very much more quickly.

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## CHAPTER XIV.

### TABLES OF SYMPTOMS OF THE DISEASES OF THE LARYNX AND NASO-PHARYNX.

THE following tables of symptoms of the diseases of the larynx and naso-pharynx have been compiled from the carefully kept records of over a thousand cases, treated both at the German Throat Infirmary and at the dispensary for throat diseases of the University Hospital of Philadelphia.

It will be observed that secondary and tertiary syphilitic throat diseases, which by many authors are separated, have been classed under one common head, because the symptoms are very similar in both forms.

It will be further noticed that only those diseases which are strictly affections of the throat have been included, while those which are to be regarded as symptoms of general systemic disorders have been left out.

*Table of Symptoms of Diseases of the Larynx.*

Symptoms.	Acute laryngitis.	Chronic laryngitis.	Tubercular laryngitis.	Syphilitic laryngitis.	Benign growths.	Malignant growths.	Functional diseases.
<b>SUBJECTIVE.</b>							
Voice	Hoarse, sometimes aphonic.	Hoarse, faltering; easily fatigued.	Hoarseness of peculiar character; aphonic in later stages.	Hoarse; seldom aphonic.	Variable, from slight hoarseness to aphonia.	Variable.	Aphonic in bilateral paralysis. Hoarse in other forms of paralysis.
Respiration	Not embarrassed except when edema is present, then dyspnea.	Not embarrassed.	Hurried; embarrassed in later stages.	Not usually embarrassed.	Embarrassment depends upon situation of growth.	Quickened and paroxysmal.	Embarrassed in paralysis of abductor.
Cough	Dry and hard; later moist.	Hacking, with starchy expectoration.	Painful; amount depending upon the lung implication.	Slight hacking.	Not severe; occasional expectoration of parts of growth.	Not severe; occasional expectoration of parts of growth.	Paroxysmal in spasmodic affections.
Deglutition	Usually painful.	Not interfered with.	Difficult and painful.	Unimpaired, unless epiglottitis or arytenoids are ulcerated.	Impaired when growth is situated on epiglottis or aryepiglottic fold.	Difficult and painful.	Not generally affected.
Pain	Feeling of constriction and acute pain.	Feeling of fullness.	Only in deglutition and phonation.	Absent.	Absent.	Severe.	Not usually present.

PHYSICAL.	Color	Form and texture	Position	External	Cause	Prognosis
	Uniformly intense red.	Swelling in edema.	Unaltered.	Unaltered.	Pharynx implicated.	Normal.
	Partially increased.	Abrasions.	Unaltered.	Unaltered.	Pharynx implicated.	Normal.
	Grayish-red.	Swelling of mucous membrane, ulcers, and pyiform swelling of arytenoid cartilages.	Usually no displacement.	Pharynx involved; physical signs of lung disease.	Same as of lung affection.	Normal.
	Brick-red in symmetrical patches.	Ulcerations and specific neoplasms.	Unaltered except when changed by cicatrices of ulcers.	Pharynx, velum, and skin implicated.	Primary sore.	Normal.
	Livid.	Depends upon size and nature of the growth; large ulcers.	Displacement by infiltration.	Glands implicated; cancerous cachexia.	Primary cancer in other parts.	Normal.
	Variable with nature of the growth.	Variable; no ulcers.	Normal parts seldom changed.	None.	Uncertain.	Normal.
	Unfavorable.	Depends upon size and position of growth.	Unfavorable.	Unfavorable.	Unfavorable.	Unfavorable.

*Table of Symptoms of Diseases of the Naso-pharynx.*

Symptoms.	Acute pharyngitis.	Chronic pharyngitis.	Syphilitic pharyngitis.	Granular pharyngitis.	Tonsillitis.	Nasal polypi.	Post-nasal catarrh.
<b>SUBJECTIVE.</b>							
Voice	Usually hoarse, with thick articulation.	Normal, unless larynx is implicated, then hoarse and easily fatigued.	Normal, or slightly hoarse. Articulation nasal if velum or uvula is ulcerated.	Usually hoarse from laryngeal implication. Articulation normal.	Normal; articulation thick.	Normal; articulation nasal.	Normal; articulation more or less nasal.
Respiration	Not interfered with except when tonsils are touching each other; later moist.	Not interfered with.	Not affected.	Not affected.	Affected only in severe cases.	Respiration through nose more or less obstructed.	Respiration through nose affected, especially in reumbent position.
Cough	Hacking; later moist.	Dry, but slight, white stringy expectoration.	Variable.	Often severe and dry, with little expectoration.	Slight.	Absent.	Slight, with expectoration of thick tenacious mucus.
Deglutition	Difficult and painful if tonsils and glands are implicated.	Not affected.	Difficult according to position of ulcers.	Not affected.	Almost insupportable, and very painful.	Not affected.	Not affected.
Pain	Severe lancinating.	Sense of dryness and burning.	Usually absent.	Sense of dryness and fulness.	Severe.	Usually absent.	Frontal headache, sense of dryness in nose and pharynx.
<b>PHYSICAL.</b>							
Color	General redness of mucous membrane.	Generally diminished, with prominent veins.	Brick-red. Symmetrical patches.	Usually paler than normal.	Tonsils appear livid.	General hyperemia of nasal mucous membrane.	Paler than normal.

Form and texture	Not changed.	Mucous membrane dry and shining.	More or less deep ulcers on pharynx, velum, and tonsils.	Red nodules and prominent veins on surface of pharynx resembling granulation.	Great tumefaction of the glands.	Depends upon character of polypus.	Tumefaction of mucous membrane. Shallow ulcers.
External	Larynx implicated.	None.	Skin implicated.	None.	Implication of cervical and submaxillary glands.	Stoppage of nose; dryness of mouth and pharynx; bleeding from nose.	Stoppage of nose, often watery discharge; slight depression of bridge of nose.
CAUSE	Exposure to cold.	Bad air, alcoholism, masturbation.	Primary sore.	Abuse of voice; gastric derangement.	Exposure to cold.	Uncertain.	Vitiated air and changeable climate.
PROGNOSIS	Favorable.	Favorable.	Favorable.	Favorable.	Favorable in most cases.	Favorable.	Favorable.





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